

RAILWAY

January 1956

TRACK *and* STRUCTURES

One of Five Specialized Railway Age Publications

This Issue:

Outlook for
Equipment Buying

How Santa Fe
Lays Long Rails

Highway Goes
Under a Station

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THE ANCHOR OF TODAY
ON EVERY
RAILWAY!



For ease in application
For effective and efficient service
For sturdy construction and long life
and for the many years of dependable
service The Improved Fair has proven
that it is the anchor of today, on
every railway.

FORMERLY

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WE FURNISH SERVICE TOO!

We know, as do all railroad men, that a trackwork machine is no better than the service behind it. In addition to selling the finest trackwork machinery in its line, Kershaw Manufacturing Company also provides complete service.

Kershaw Manufacturing Company stands squarely behind every machine it sells. To insure proper performance of Kershaw machines, we maintain a staff of servicemen throughout the country. They are always happy to help when you call on them. But for quick service, contact Kershaw Manufacturing Company in Montgomery. We'll get in touch with our servicemen in the field and direct them to your job.

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Have YOU Tried the Kershaw "Try and Buy Plan"?



Strength? This stand has it to spare

There it stands and serves, day in, day out, year after year. It seldom gets (and rarely needs) more than a passing glance. For this is Bethlehem's Model 53, one of the most tireless sentinels ever to work on the railroad. The only favor it asks is an occasional spot of oil.

Top to bottom, this stand is built with strength to spare. The extra-husky spindle is a heat-treated steel forging. The sliding block which develops the turning leverage is also heat-treated for long service. And when at last it does begin to wear, you can simply turn this block 90 degrees in either direction to bring two fresh sides into play. Just that easily you have gained the equivalent of a brand new block!

The screw-eye crank is a heat-treated alloy steel forging, with rounded thread roots to give maximum protection against progressive cracks in the shank. The switch stand base is cast of malleable iron for a smooth, firm bearing on the ties.

There are probably a number of points on your system where switching movements are heavy enough to test the stamina of any switch stand. Those are the very points where Model 53 belongs. A Bethlehem representative will be glad to talk to you in detail about this durable switch stand. Any time, any place, at your convenience!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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Where hand scalping costs are too high!

Effectively **Stop Weeds**
this low-cost thrifty way!



NOTHING TO MIX

NO WATER TO HAUL

Concentrated Borascu®

SAVE Up to 85% of your grassing costs!
Put Concentrated Borascu Weed Killer about your timber structures, yards, tie piles, sidings and buildings to get greatest protection from brush fires at lowest cost! Weeds-grasses are stopped, leaving nothing but bare ground wherever Concentrated Borascu is applied properly. Don't sacrifice your costly man-power on grassing...this modern method is thrifter!

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Weeds and grasses just *can't* grow on soil where Borascu has been applied! And such soil remains sterile for long periods because this inorganic borate doesn't break down. Applications are simple; there is nothing to mix...no water to haul and the most unskilled laborer can do the job. You'll find it pays to use Concentrated Borascu.

Saves you Dollars!
Kills Weeds for Pennies!



PACIFIC COAST BORAX CO.

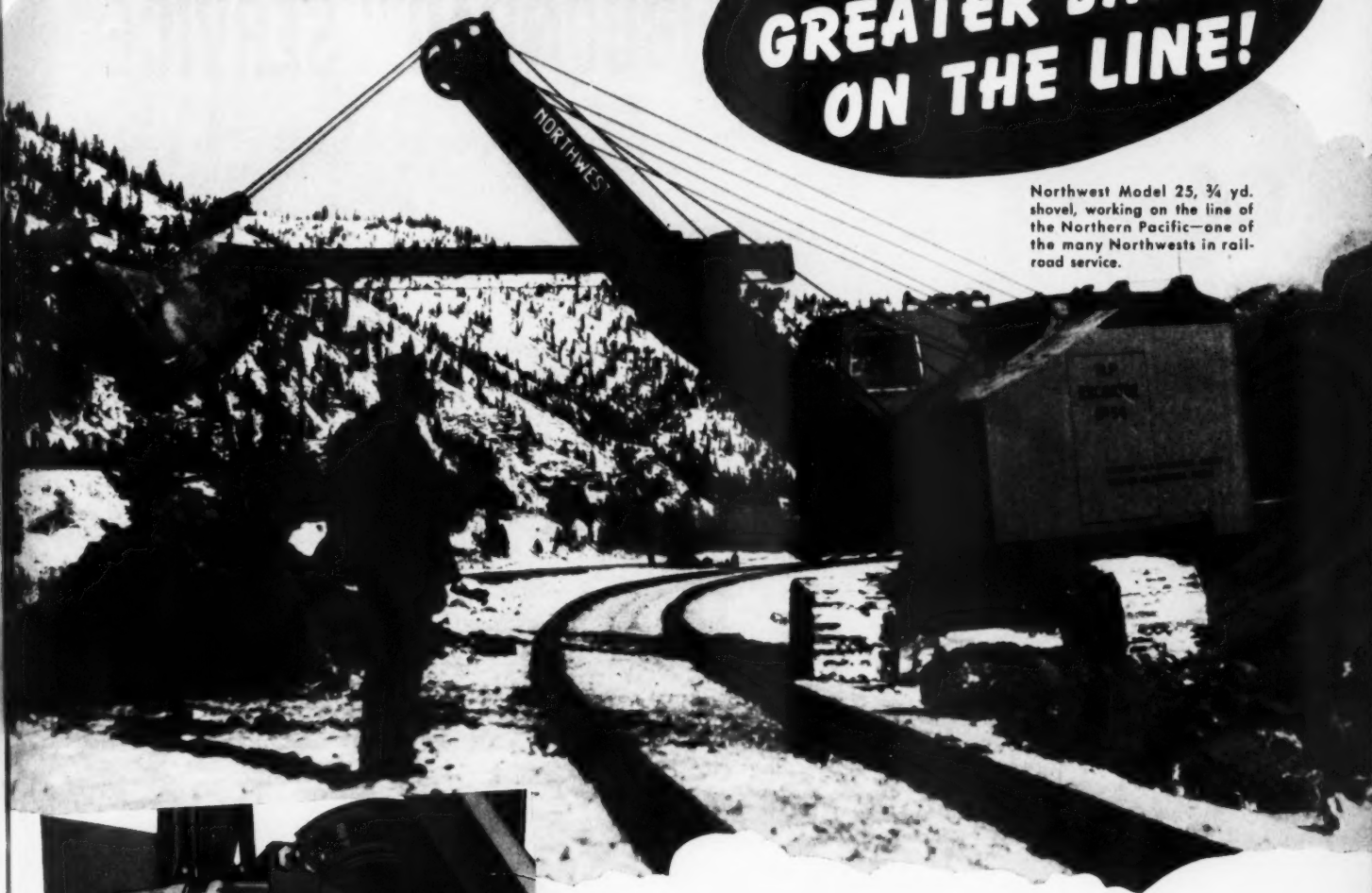
DIVISION OF BORAX CONSOLIDATED, LIMITED

630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA

MECHANICAL EASE OF OPERATION

Means
**GREATER SAFETY
ON THE LINE!**

Northwest Model 25, ¾ yd. shovel, working on the line of the Northern Pacific—one of the many Northwests in railroad service.



This is all there is to the Northwest "Feather-Touch" Clutch Control. Just a simple drum device, free from complications or delicate mechanisms and it needs no special knowledge for adjustment.

JERKY operation, balky clutches, slow acting controls, not only delay a job but they are *dangerous* in railroad operation. Your Northwest provides ease of operation and nicety of control with a direct mechanical device. The "Feather-Touch" Clutch Control is free from complications. There are no compressors, no pumps, no tubes, nothing to be affected by temperature or weather. Your Northwest *can't be shut down* because of control failure.

The "Feather-Touch" Clutch Control is a simple drum device that utilizes the power of the engine to throw the main drum clutches. It reduces operator fatigue and keeps the output curve up. It is extremely sensitive and provides instant response to controls. The action of the main drum clutch is in direct proportion to the movement of the operating lever and the *feel of the load* is always present. Release is positive, and straight manual control can be introduced at any time.

This is only one of the many Northwest advantages that make the Northwest a better railroad machine. Ask for more complete details.

NORTHWEST ENGINEERING CO.
1513 Field Bldg., 135 South LaSalle Street,
Chicago 3, Illinois

**DOES
THINGS
NO TRACK-TYPE
RIG CAN DO**

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
CRAWLER OR RUBBER MOUNTED SHOVELS



525-T-OG

More and more "RIBBONRAIL" SERVICE



year after year **BECAUSE...**

1

Faster, higher quality production is continuing to reduce weld costs in spite of rising labor and material costs.

During the 18 year history of continuous rail, installation time and welding costs have constantly decreased . . . Hundreds of miles of this safe, trouble-free rail are already in service in all sections of the country, and major railroads are installing more all the time.

2

From weld making to rail laying, modern engineers have developed continuous rail laying into a swift, efficient operation.

Reduce your track, roadway, and rolling stock maintenance, and improve riding qualities. Look to LINDE, the leader in continuous rail welding, and plan for RIBBONRAIL Service now. Call or write the Railroad Department of Linde Air Products Company.

look to **LINDE** for **RIBBONRAIL** service

Service Mark



RAILROAD DEPARTMENT

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

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Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol . . .

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Quality
GAGE and LINE
go "hand in hand"



NORDBERG
TRAKLINER

... get better riding track
with these 2 NORDBERG
"Mechanical Muscles"®

● With the Nordberg Dun-Rite, the gaging operation follows right behind the Adzers and fastens the tie plates to the ties in exact position, so that when the rail is placed the head-to-head gage is correct. The Dun-Rite method is base gaging and it is actually the outside shoulder of the tie plate which is gaged. Write for Bulletin 220.

With the self-contained, self-propelled Nordberg Trakliner, you can line track in connection with track raising, spot surfacing, new work or improvement programs at amazing savings. The Trakliner uses easily controlled hydraulic power to line the track any desired amount. Two men and the Trakliner will line all the track a gang can raise or spot surface in a day. Write for Bulletin 230.

Many major roads have proved that these two sets of Nordberg "Mechanical Muscles" have given them better gage, better line and hence better track—at appreciable savings in time and maintenance dollars . . . another example of the advantages you get by using Nordberg Track Machinery.



USE NORDBERG
"Mechanical Muscles"®
TO DO A BETTER,
FASTER MAINTENANCE
JOB AT LOWER COST

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R255-R

ADZING MACHINE • BALLAST ROUTER • CRIBEX • BALLASTEX • SCREENEX • HYDRAULIC
& MECHANICAL SPIKE PULLERS • SPIKE HAMMER • TIE DRILL • POWER JACK • POWER WRENCH
• RAIL DRILL • RAIL GRINDERS • TRACK SHIFTER • DSL • YARD CLEANER • TRAKLINER •
DUN-RITE GAGING MACHINE • GANDY—TIE PULLER and INSERTER

NORDBERG MFG. CO., Milwaukee, Wis.



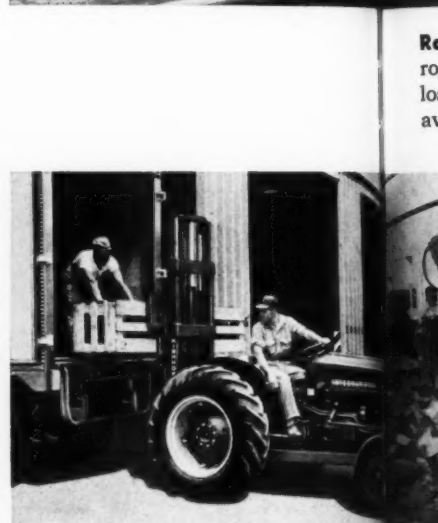
A PICTURE REPORT OF

INTERNATIONAL POWER

Boosting job production everywhere

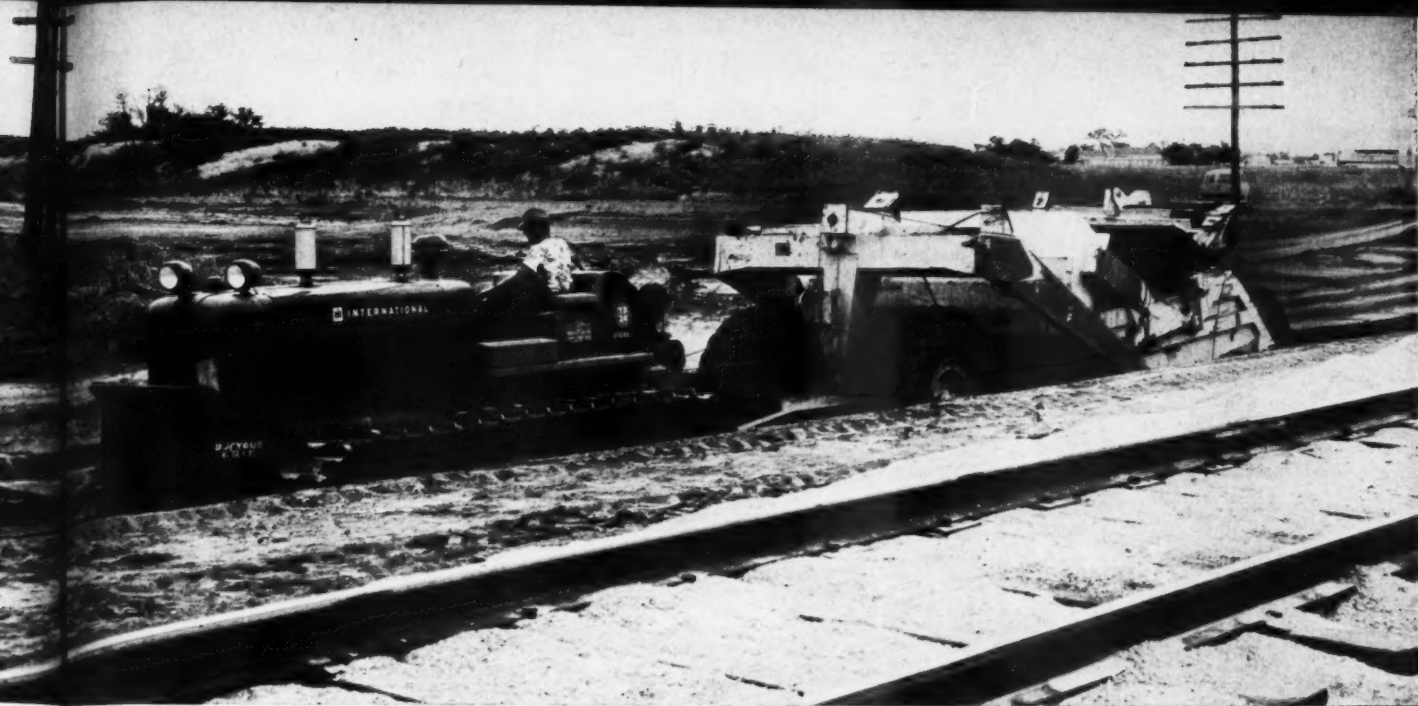
Rolls 65,000 yds in 20 days—Compacting fill was job assigned this 59 dhp WD-9 tractor, biggest of the 6 wheel-type utility tractors made by Interna-

tional. 65,000 yds took 20 days. Photo was taken on same Missouri Pacific RR job as shown at right—raising grade for approach to new bridge in Wichita.



For utility work in your yard or along the right-of-way, new International 300 can be equipped to do almost any task. Here, rig loads trucks to be used on "piggy-back" service. With other attachments, the "300" pulls baggage carts, mows grass, cleans ditches, repairs small washouts, plows snow, digs post-holes, etc. Rig has 10 speeds forward to 16.7 mph, develops 4,379 lbs pull.

Bulds 400-ft railroad spur in 2 days—Along the Southern RR line at Doraville, Georgia, TD-14A and 10-yd scraper needed only 20 hours to self-load and move 4,000 cu yds for 400-ft spur. Said Job Supt H. S. Gilleland, "This is our 14th TD-14 in 10 years—and the best yet! Easy to maneuver, plenty of power, cool operation, and the controls are in easy reach."



Raising 1½ mi of track for the Missouri Pacific Railroad near Wichita, Kansas, this TD-24 regularly self-loaded side-boarded scraper with 25 cu yds. With hauls averaging ¾ mi one-way, 2 of these tractor-scraper

teams completed the 65,000-yd job in 20 calendar days. Supt Barney Bucheit reports the older TD-24 worked 6,000 hours on all jobs before tracks needed changing.



Ripping out 150 yds of concrete in front of a Camden (N.J.) station was a job too tough for a ¾-yd shovel, according to engineers. This International Drott® TD-14A, however, did the work unassisted. Unit's tremendous break-out force, 17,000 lbs, broke up the slab . . . even tore out 5-ft concrete footings.



"Ideal for dozing rock," is report on this TD-14A used in Iowa for shovel and quarry-floor clean-up. "Performance is excellent," says Supt, and "downtime way down. This is due partly to rugged construction, partly to prompt service from our IH distributor." Quarry produces 200 tons of 1-inch stone per hour.

International

makes every load a pay load



Industrial Power

A machine size for every job . . . see your nearest
**INTERNATIONAL
DISTRIBUTOR**
for details.

PATENTERS
12 yrs. and 10½ yrs.

TRACTOR
12 yrs. and 10½ yrs.

TRUCK
12 yrs. and 10½ yrs.

TRUCK
12 yrs. and 10½ yrs.

Also: International Tractor, International Harvester, International Tractor, International Harvester, International Tractor, International Harvester, International Tractor, International Harvester.

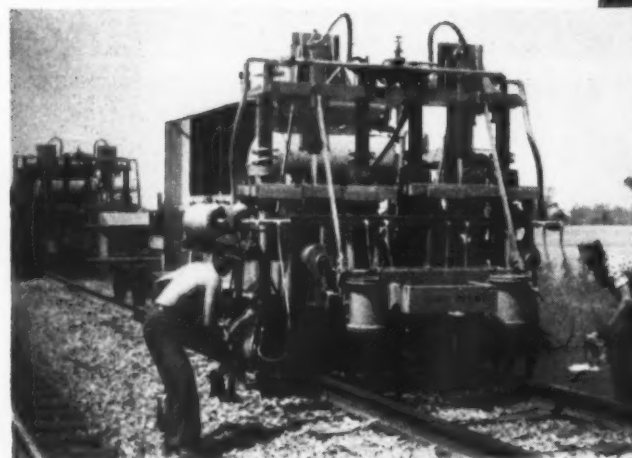
R.M.C. TIEMASTER replaces ties at a rate of one per minute, with minimum disturbance to the bed.



R.M.C. SPIKEMASTER spikes ties tightly against the rails, operating at better than six ties per minute.

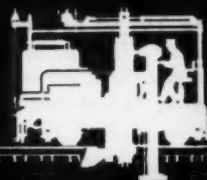


McWILLIAMS BALLAST DISTRIBUTOR places ballast in desired quantity and depth in exactly the proper position for tamping.



This
mechanized
maintenance
gang

*cuts costs
drastically*



1. R.M.C. TieMaster removing old ties and inserting new ones.



McWILLIAMS TIE TAMPER finish tamps any raise up to 6" at speeds up to 720 feet per hour.

R.M.C. LINEMASTER lines over 6,000 feet of track per day, using an operator and one man sighting. Produced in rail and crawler-mounted types.

Savings are SPECTACULAR!

with the right combination of
Mechanized Maintenance Machines



2. R.M.C. SpikeMaster nipping up the ties and driving four spikes.



3. McWilliams Ballast Distributor placing ballast in perfect position for tamping.



4. McWilliams Tie Tamper with split head using controlled pressure to compact ballast under the ties.



5. R.M.C. LineMaster aligning the track by moving it horizontally in either direction.



McWILLIAMS SUPER MOLE cleans or excavates shoulder ballast, operating at speeds up to 2400 feet per hour.

Our experiences with Mechanized Track Maintenance Gangs show that the substantial cost savings offered by modern equipment can be multiplied . . . when machines are used in the right combination.

May we discuss this important new phase of mechanized track maintenance with you?

Railway Maintenance Corporation

PITTSBURGH 30, PA.

PIONEER IN MECHANIZED TRACK MAINTENANCE





"Our ballast is clean as a whistle!"

Dow products keep vegetation down
... keep roadbeds clean and safe

A lot of things make up a trainman's pride! His railroad's crack trains, for instance, and its reputation for smooth operation from the roadbed up. Weed-free ballast is the least of *his* worries. He leaves this to a "chemical crew" of Dow products—Radapon*, containing Dalapon Sodium Salt 85%, and 2,4-Dow* Weed Killer, Formula 40—to control grass and broadleaf weeds in roadbeds.

He leaves it to maintenance officials to plan a low-cost spraying program to keep right-of-ways brush-free, sightly and safe. It is to these men that Dow offers technical service and assistance on the use of Esteron® 245, Esteron Brush Killer and Esteron Ten-Ten*—plus the first two products mentioned. Write THE DOW CHEMICAL COMPANY, Agricultural Chemical Sales Department, Midland, Michigan.

*Trademarks of The Dow Chemical Company.

you can depend on
DOW AGRICULTURAL
CHEMICALS



THE *Matisa* BALLAST CLEANER

**LOWERS TRACKS
FOR BETTER
CLEARANCES**

IN TUNNELS!



Photo courtesy Norfolk & Western Railway

The only Ballast Cleaner that does a **COMPLETE** job . . . It not only cleans or excavates ballast in cribs, under the ties, on shoulders and between tracks . . . but also restores tracks to original grades at bridge approaches and under overhead structures as well as in tunnels. *Most important—The Matisa Ballast Cleaner Reduces Maintenance Costs.*

Matisa

EQUIPMENT CORPORATION

1020 WASHINGTON AVE., CHICAGO HEIGHTS, ILLINOIS

TRACKWORK SPECIALISTS ALL OVER THE WORLD



News Notes

... a resumé of current events throughout the railroad world

RAILWAY

TRACK *and* STRUCTURES

JANUARY, 1956

A "package" wage increase of 16½ cents for non-operating employees, recommended by a presidential emergency board, would cost the railroads \$290 million a year.

Class I railroads had an estimated net income of \$753 million in the first ten months of 1955, an increase of \$269 million compared with the same period last year. Net income for October was \$92 million compared with \$77 million for October 1954.

Business of the cargo air carriers will be on an annual basis of 800 million ton-miles by 1965, as forecasters of the Civil Aeronautics Administration see it. They predict, too, that 1965 will find half of the domestic travel market served by common-carrier air lines which now do about 29 per cent of the business.

Extension of the C&NW from Lander, Wyo., to Ogden, Utah, about 185 miles, is being talked about in Chicago. The extension will give a connection with the SP and WP, setting up a new east-west through route.

A remotely controlled train was demonstrated on the New Haven last month where an experimental set-up demonstrated techniques whereby "automatic" railroads come closer to realization.

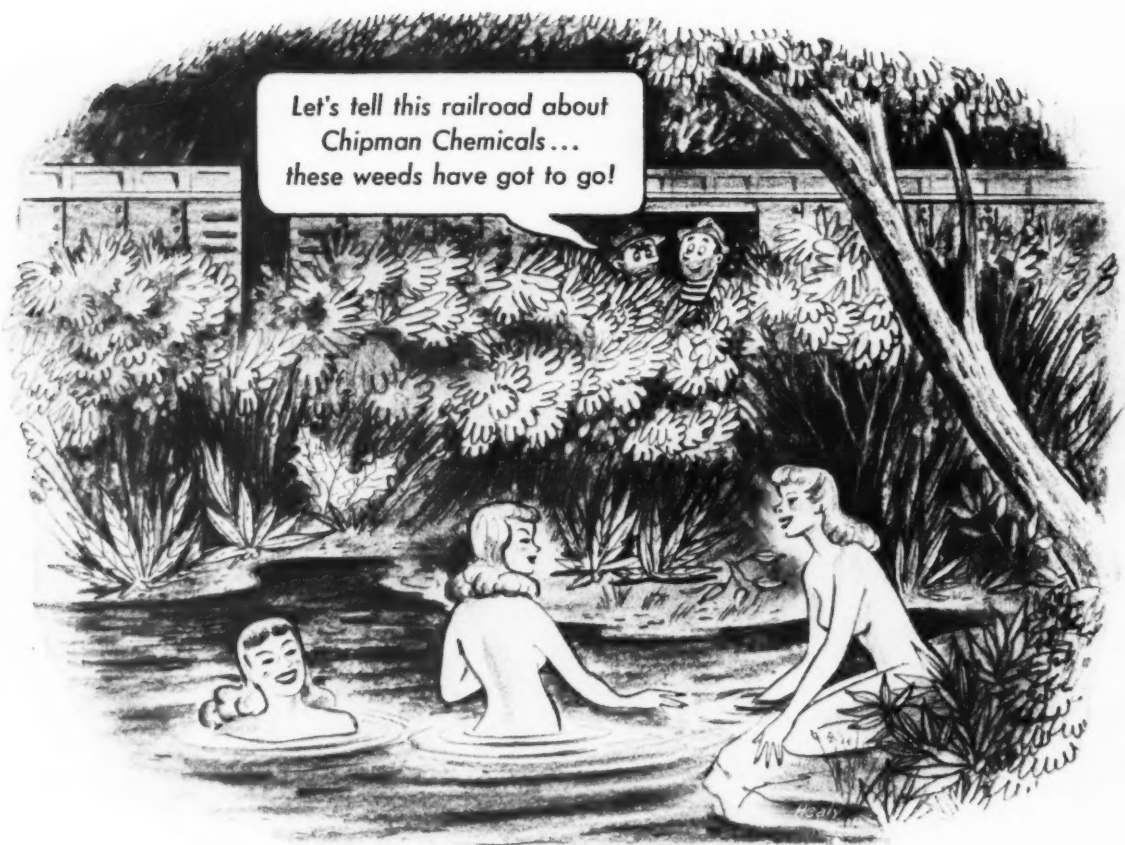
Railroads laid 873,626 tons of new rail last year in replacement at a total cost of \$90,744,000—average cost per ton—\$103.87. This 1954 tonnage was the lowest in 14 years, but the cost was the highest. Comparable 1953 work involved laying 1,132,837 tons at a cost of \$95.35 per ton. Biggest year of the past 14, tonnagewise, was 1945 when 1,613,548 tons were laid at an average cost of \$46.05 per ton.

GM's "Aerotrain" is being tested on Rock Island between Peoria, Silvis, and Bureau, Ill. The NYC and PRR will make simultaneous exhibition runs with two sets of "Aerotrain" equipment January 5. NYC's train will run between Chicago and Detroit, the PRR's in the New York-Washington area. The UP would like to buy some of the "Aerotrain" equipment if tests now underway demonstrate that train comes up to expectations.

The U. S. Supreme Court has agreed to review rulings of Nebraska courts which held that the U. S. Congress was without authority to impose the union shop provision of the 1951 amendment to the Railway Labor Act upon employees of that state.

The Union Pacific has ordered fifteen 8,500-hp gas turbine-electric locomotives from General Electric and intends to buy 30 more. Total cost of the 45 units would exceed \$38 million. UP's present fleet of 25 gas-turbine-electrics has 4,500 hp per locomotive.

The New York Central is putting the final touches on a thorough-going staff reorganization. The new plan features decentralization of certain functions; division of the system into four regions; creation of full line-and-staff organizations for the respective general managers; and extension of authority of the managers and division superintendents.



Chipman Chemical Company weed killers, brush killers and application service are backed by over 40 years of experience in serving railroads. An extensive line of weed, grass and brush killing chemicals is available to meet varying conditions. Included are the following:

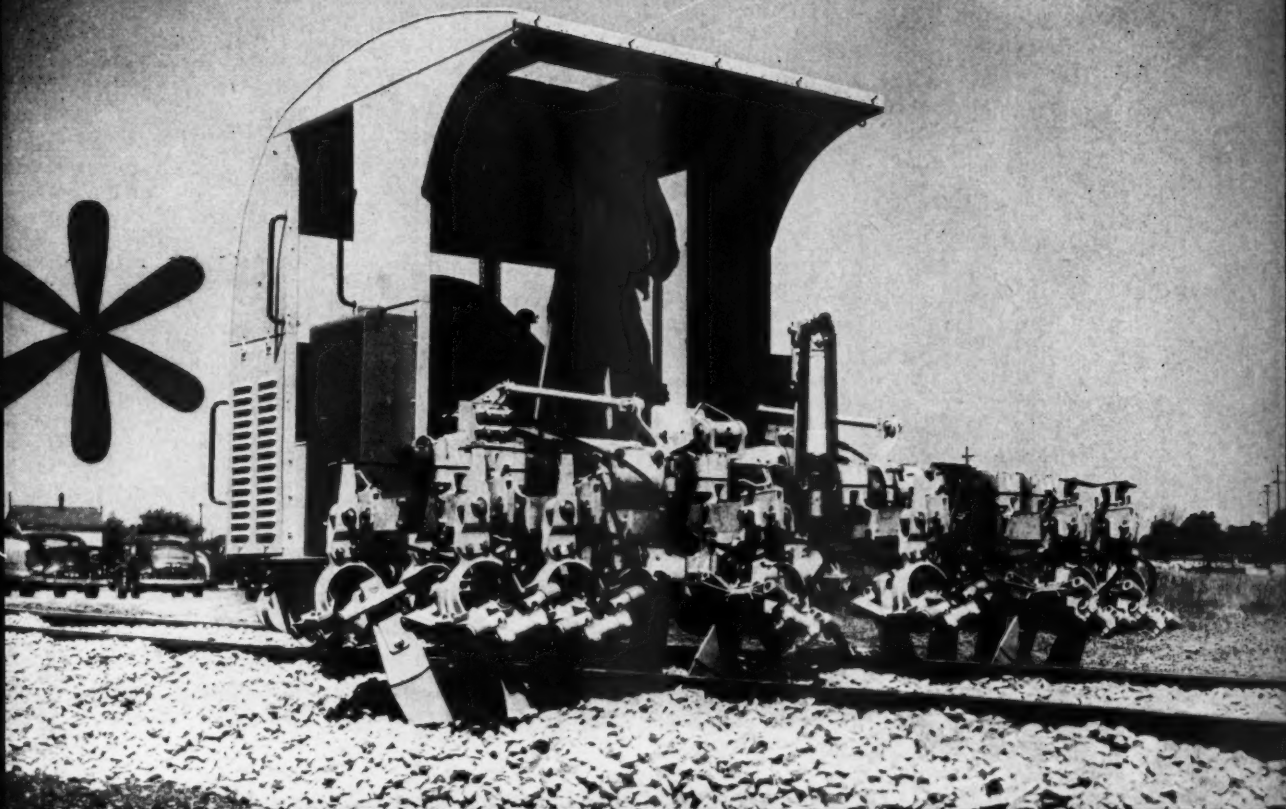
Atlacide	Atlas "A" Arsenical
Chlorax	Atlas "D"
Chlorax "40" • Chlorea	Brush Killer
TCA-Chlorax	Telvar W
Methoxone-Chlorax	Borax • Dalapon

Let us solve your weed problems with the *right* chemicals and application service.

CHIPMAN
Chemical Company, Inc.
 Bound Brook, New Jersey

16 Strategically Located Chipman Plants





JACKSON MULTIPLE TAMPER

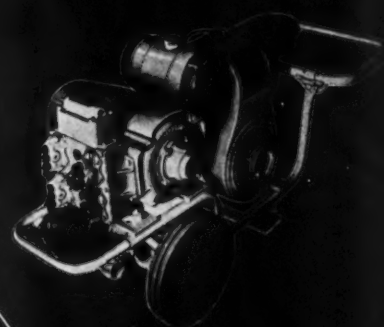
***FOR 1956**

Unsurpassed for putting up track of finest uniform quality in any lift from moderately low to high. Initial cost is far less than any other on-track tamper.

JACKSON HAND TAMPERS and POWER PLANTS

Ideal for low lift and smoothing work with small gangs using 2 and 4 tampers. Perfect for tamping the portions of crossings and cross-overs that the on-track tampers do not reach. Excellent for major ballasting operations since any number of these outfits can be grouped for the purpose. Long-time leaders in the hand tamper field, Jackson tampers are now more powerful than ever, fitted with adjustable handles for maximum convenience of all operators, available with quickly interchangeable tamping blades which give them unmatched adaptability and efficiency on every type of tamping job.

Model M-22 Power Plant serves 2 to 4 tampers, is thoroughly reliable, easily portable. Also serves well for lighting, emergency signaling and operating other power tools.



MAFD BY
JACKSON
VIBRATORS
INC.
LUDINGTON MICH



LUDINGTON, MICHIGAN



Tournatractor crosses tracks without blocking, does no damage to rails or switches. Big, low-pressure tires deflect to move load evenly over obstructions . . . do not chamfer ties, trip or damage block signals.

Tournatractor travels between jobs along right-of-way, cross-country, or over paved highway at speeds to 19 mph. A phone call is all it takes to get this "one-man work crew" in motion.



***RUNS* to maintenance jobs**



BACKFILLS CULVERTS

This is typical of the jobs that Tournatractor can handle without the help of other equipment. When mainliner barrels through, 186 hp tractor-on-rubber pulls to one side . . . minutes later is working again. No delaying of traffic . . . no moving of work train onto siding . . . no idle track gang.



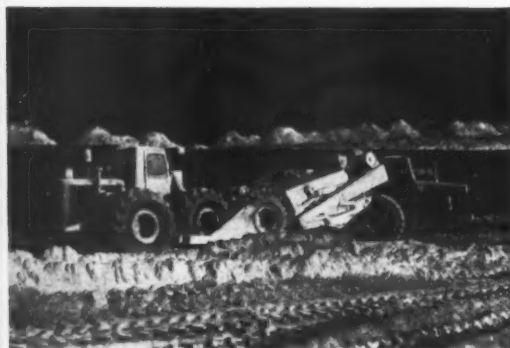
STOCKPILES COAL

With dozer blade or scraper, 19 mph Tournatractor stockpiles coal, cinders, or ballast. Low-pressure tires compact and seal coal-pile against fire . . . do not grind coal into fines like tracks. Its 4 tires do a better job of compaction than crawler's 550 track parts . . . yet have less maintenance.



CLEARs LANDSLIDES

A minute after emergency occurs, Tournatractor is on the way. Doxing in 2nd gear (3.7 mph) and backing up at 8 mph, Tournatractor makes short work of a rock slide like this. As a result, trains can resume schedules faster . . . tracks are not blocked by work train. No planking is necessary.



PUSH-LOADS SCRAPERs

Teamed with Tournapulls on 800,000-yd. rail spur line in Montana, this Tournatractor pushed 42 loads of sand an hour. Load distance for 9½ cu. yds. averaged 75' . . . load time, 30 seconds. Torque converter enables Tournatractor to match scraper speed for fast, efficient loading.



PULLS HEAVY EQUIPMENT

Skidding heavy compressor is one of many pulling jobs your Tournatractor can handle. 186 hp diesel and 4-wheel drive give plenty of drawbar pull to handle heavy loads. Unit pulls scrapers, tows Rooters, pulls trailers, skids generator plants, poles, ties, assists stalled trucks, etc.



SPOTS RAILROAD CARs

Powerful Tournatractor spots cars in emergencies . . . keeps sidings clear for incoming freight. Instant-shift gear selection keeps unit pushing without losing vital momentum. Unit straddles rails with room to spare. Tournatractor can also assist derailed cars back onto track.

Big
plus
big c
ing e
equip
place

Tourna
wide.
drifts
widens
shoe p
for ber

s anywhere in your division



CLEANS UP YARD

Big blade, 186 hp "push", instant gear change, plus 8 mph reverse, enable tractor to outwork any big crawler. Unit generates own electricity for raising and lowering blade, and operating towed equipment. 3-yd. Angledozer can be mounted in place of 2 1/2-yd. Bulldozer.

or is on
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blocked



PLOWS SNOW

Tournatractor V-type snow plow clears path 12'3" wide. Vertical center divider plate cuts frozen drifts, eliminates plowing snow back on road when widening. Big low-pressure tires, adjustable runner-shoe protect plowed surface. Electric-controlled wing for benching is available.

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derailed

Do your scattered earthmoving jobs faster and cheaper with one man and a rubber-tired Tournatractor!

No need to get a work train ready. No time-consuming loading and unloading of equipment. No waiting for dispatchers and a clear track. Operator just hops on and goes — over tracks, pavement, bridges, along right-of-way, or highway. Averages a mile every 3 or 4 minutes.

Once on a job, Tournatractor gets right to work. When dozing, it delivers 2 1/2 yds. every few seconds. It also pulls equipment speedily, uproots trees, brush, cuts slopes, etc. Because of its greater speeds, it will outwork the biggest crawler-tractor on almost every assignment, 2 or 3 to 1. It has 4-wheel drive, instant gear change with constant-mesh transmission, torque converter, powerful 4-wheel disc-type air brakes, and fast finger-tip electric control. It's easy to operate, handy to maneuver, safe and dependable, needs little maintenance. It gets work done fast without delays to rail traffic. And it goes from job to job in a hurry!

With high-speed, free-traveling Tournatractor, you eliminate a lot of trouble because it gets around to make repairs before damage is serious. Tournatractor improves drainage, replaces eroded fills, repairs shoulders, spreads ballast in low spots, keeps all sorts of right-of-way "housekeeping" up-to-date. One man with Tournatractor can put many miles of right-of-way into tip-top condition for less than repair cost of one wash-out. Let us show you what 19 mph Tournatractor can mean to you in better maintenance for less money!

Tournapull, Angledozer, Reeler, Tournatractor—Trademark Reg. U.S. Pat. Off. T-643-RR-w

LeTourneau - WESTINGHOUSE Company

Peoria  Illinois

A Subsidiary of Westinghouse Air Brake Company

TRACK *and* STRUCTURES

Subject:
Dear
Readers:

The Boss Has Rights, Too

We're still on the subject of human relations in business, which was discussed on this page in the December issue. What we wish to do this month is to focus attention on a facet of this problem which we believe is getting far too little attention.

Nearly everything we have read about the human element in business puts the responsibility for getting good results directly on the shoulders of the boss. Much advice is offered for him to follow if he expects to be successful. He is to treat his subordinates with patience and sympathetic understanding. To satisfy the human need for recognition he should praise his co-workers for work done well, and he should take the time to explain the reasons for unusual instructions or changes in plans. He should do everything he can to make the worker feel that he is an important and integral part of the organization. All these things, and many more, the boss is urged to do.

Without any thought of disparaging the advice given for the boss to follow, we feel it is very much in order to suggest that this is not a one-sided problem, that perhaps subordinates, too, must accept part of the responsibility for achieving and maintaining good human relations.

Let's assume a situation where a worker (he may be a section laborer or a chief engineer) is not on good terms with his immediate superior. There is tension and friction between them, and tempers are always at the point where an eruption seems imminent. It is easy (and human) for the subordinate to assume that the fault lies with his boss. Doubtless this is the case in many instances, but certainly not always. Before jumping to conclusions, the subordinate might well do some soul searching in regard to his own attitudes and actions.

There are various ways in which, perhaps unconsciously, he is conducting himself in such a manner as to be displeasing to his boss. Perhaps he has an arrogant or independent attitude. On the other hand he may be too meek or subservient, thus causing his boss to lose respect for him. Again he may not be doing the best job of which he is capable, or he may be shifting too many of his problems to the boss' shoulders.

These are just a few of the attitudes that can result in a strained relationship between a man and his superior. Where they exist it is asking too much to expect the boss to assume the responsibility of maintaining the relationship on an even keel. But this is exactly what we might be led to do if we were to accept without qualification the great amount of material that is being printed on this subject today.

We need to have a balanced perspective of this problem. Perhaps it might help if we were to review briefly the development of the present situation. There was a time when the average boss subscribed to the theory that the only way to get maximum production from his men was "to crack the whip," loudly and frequently. That theory is now in the discard—and good riddance! The danger now is that we will go to the opposite extreme. That state of affairs should be avoided at all costs for it would engender evils as great as those that prevailed during the "crack the whip" era. MHD

"On-Site" Housing and Field Offices

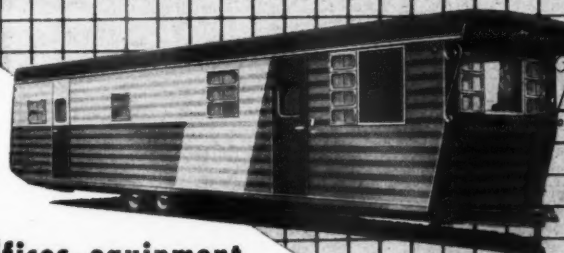
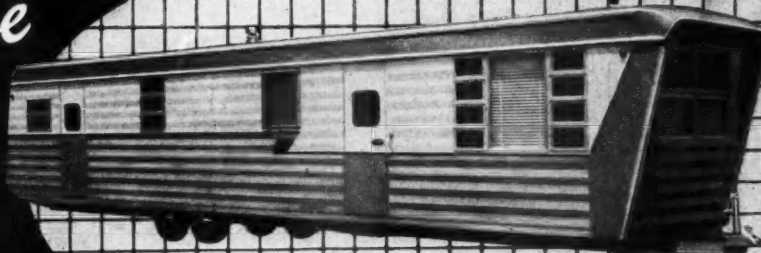
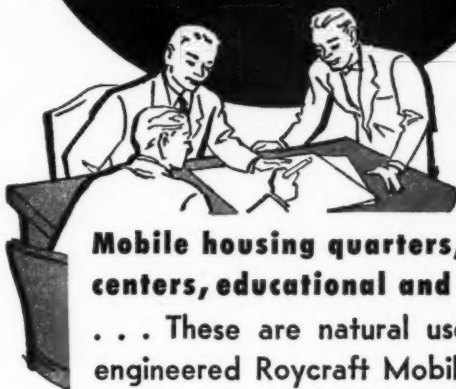
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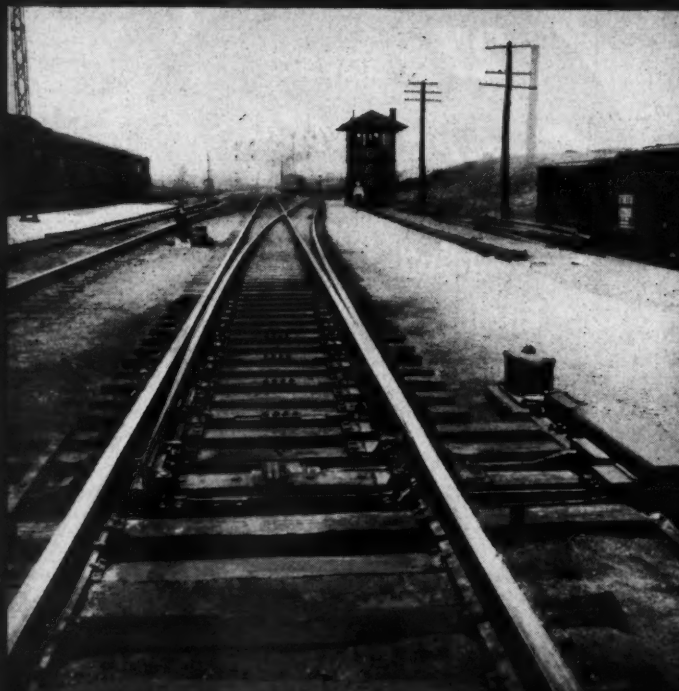
ECONOMICAL

THE RACOR TIE PAD

(PATENT PENDING)

PROVIDES

Maximum Protection at Minimum Cost



The RACOR TIE PAD is a rubber fibre compound of minimum thickness possessing the necessary tensile and compressive strength to withstand the destructive forces in track, yet is sufficiently flexible to adapt itself to the irregular surfaces of the ties.

This Tie Pad is the result of intensive research and many years of experience in the manufacture of this type of material, giving us the "know-how" to produce a Tie Pad of maximum utility at minimum cost.

Exhaustive tests on the RAMAPO Tie Wear Machine show that the RACOR TIE PAD is most effective in preventing tie abrasion, in maintaining a clean, comparatively moisture-

free tie under the pad, and in maintaining its own shape and physical properties under the severest test conditions.

All RACOR TIE PADS (unless specifically ordered otherwise) are coated with a special sealing compound which is stable over a wide temperature range. This seals the pad to the tie and prevents the entrance of foreign materials, such as sand, dirt and water between the pad and the ties, thus assuring maximum protection to the wood immediately under the pad.

AMERICAN

Brake Shoe

COMPANY

FEATURES

★ The **RACOR TIE PAD**
will extend tie life
because it will:

1. materially reduce or eliminate plate cutting
2. reduce spike killing
3. retard softening of the wood fibre under the pad

★ The **RACOR TIE PAD**
will extend the effectiveness of
track fastenings because it will:

1. cushion shock
2. delay deterioration of the tie

★ The **RACOR TIE PAD**
will maintain better surface
and gage because it will:

1. cushion shock
2. distribute the load more evenly
3. reduce or eliminate eccentric plate cutting
4. extend the effectiveness of the tie plate fastening



RACOR Tie Pads are impregnated with a fungicide which retards deterioration of both tie and pad.

The economies possible through the use of the RACOR TIE PAD will provide greater savings than heretofore possible. Their use should be considered wherever severe tie wear, expensive ties or bridge timbers or high maintenance costs prevail. When used under insulated joints the life of the insulation is extended and joint maintenance is reduced.

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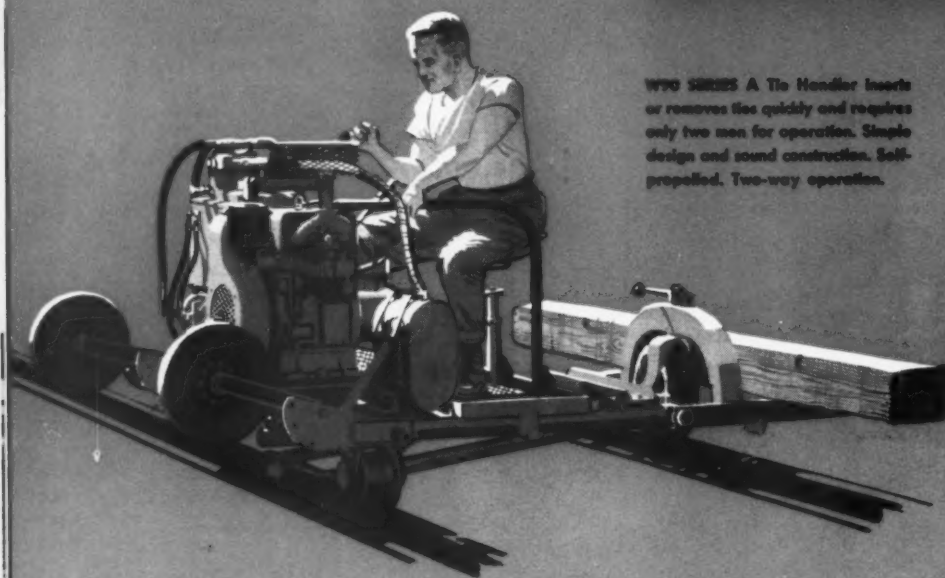
7" x 10 1/2"	7 3/4" x 12"	7 3/4" x 19"	8" x 12 1/2"
	7 3/4" x 12 1/2"	7 3/4" x 22"	8" x 17 1/2"
7 1/2" x 10"	7 3/4" x 13"	7 3/4" x 24"	8 3/4" x 14"
7 1/2" x 11"	7 3/4" x 14"	7 3/4" x 26"	9" x 11"
	7 3/4" x 14 3/4"	7 3/4" x 28"	
7 3/4" x 10 3/4"	7 3/4" x 15 1/2"	7 3/4" x 30"	10" x 24"
7 3/4" x 11"	7 3/4" x 18"	7 3/4" x 32"	14" x 14"

Other sizes can be furnished, but generally the above standard sizes will take care of most installations.



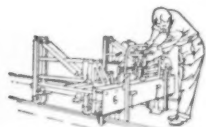
When you think of
TIE RENEWAL

... think of
Fairmont

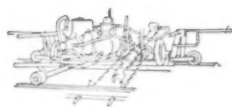


W70 SERIES A Tie Handler inserts or removes ties quickly and requires only two men for operation. Simple design and sound construction. Self-propelled. Two-way operation.

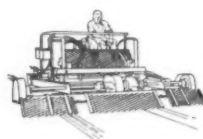
Through the course of its fifty years, Fairmont has turned its skill and ingenuity to virtually every problem confronting railway maintenance. And in each case, the result is written clearly in the record. Take a look, for instance, at the masterful products which Fairmont currently produces to assist the industry in the task of tie renewal. To be sure, they are only a few of the units which Fairmont manufactures for this field of maintenance—but they do emphasize the great scope, the wide variety and the unquestioned quality of all Fairmont tie renewal products. And, as experienced railway personnel know, they are thoroughly “Fairmont” in their dependability, their economy and their thoroughness of operation. In short, they offer positive proof that when you think of tie renewal, it pays to think of Fairmont—the first and finest name in railway maintenance!



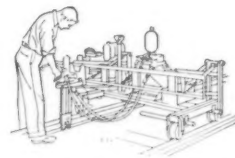
W86 SERIES A Hydraulic Rail Lifter features a spring-counterbalanced lifting arm, welded steel supporting frame and a direct-driven hydraulic pump. Two-man track removal.



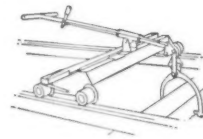
W68 SERIES A Hydraulic Tie Remover removes ties at an average rate of approximately one per minute. Ruggedly built with a minimum of moving parts. Two-man operation.



W87 SERIES A Tie Bed Scarifier with one operator can dig a tie bed a minute to a controlled depth at right angles to rails. Assembly and drive are hydraulically operated.



W84 SERIES B Hydraulic Spike Puller is primarily for use in tie gangs. Light in weight, it features a ball and socket-mounted pull assembly. Will pull from either rail without change-over.



W83 SERIES A Tie Nipper features a simple linkage and lever which guarantee positive opening and closing of hooks. The handle can be placed in three different positions.

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RAILWAY

TRACK and STRUCTURES

JANUARY, 1956

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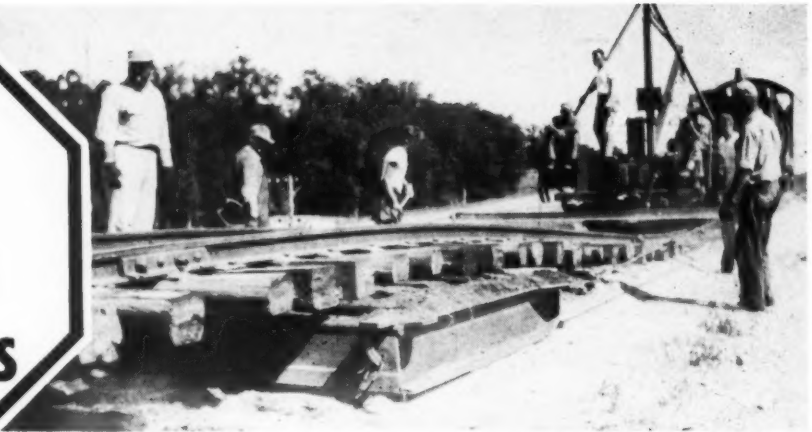
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Existing ballast on N.P.'s Yellowstone Division was used for initial 3½-inch raise. Lift effected by the sled permitted old ties to be replaced without the use of jacks. Completely skeletonized track settled back on crib material that had been redistributed by the sled. Second pass of sled gave a further raise on new ballast.

1 MILE PER DAY

using Mannix "Sled Plow" method:

Mannix-perfected ballast sled and plow enabled the Northern Pacific to skeletonize a mile of track . . . raise from 4 to 6 inches and renew over 400 ties . . . in one 8-hour working day! Total cost reduction reported by the road's maintenance officers: one third. Rental of this special equipment can speed your rehabilitation program. Write, phone, or wire Mannix International for details.



(Left) On the Sumas Branch, Tacoma Division, 13 miles of badly fouled ballast were renovated by plowing old ballast out for additional subgrade material. (Right) The track with badly fouled ballast was first skeletonized



with a MANNIX plow, tie renewals were made, new ballast dumped, then using a MANNIX sled a uniform layer of new ballast was placed under the ties in record time.

MANNIX INTERNATIONAL INC.

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TRACK *and* STRUCTURES

Editorial Opinion

Machines Vs. Machines

How long has it been since the itemized list of work equipment on your road has been reviewed? Such a review may produce some surprises. For instance, how many units will be found to be five years old or older? What about their performance?

If all of any road's work equipment were offered for sale, how much money would it bring? Turning the question around, how many roads would buy their own equipment? It is a safe guess that at least a third of it—or, more probably, a half—would be considered obsolete and not to be purchased at any price. Why, then, is it kept?

For over a decade, maintenance men have been mechanization hungry. Any machine, no matter what its vintage, was a welcome aid because it accomplished far more than hand

labor. However, this is no longer the age of hand labor. In 1945, there were an average of 300,761 employees engaged in maintenance of way and structures; in 1954, only 199,102. This is a reduction of 37 per cent in 10 years!

Hence, THIS is the age of mechanization and we must adjust our thinking accordingly. The practice of hanging onto and using a machine only because it is superior to hand labor is based on outmoded thinking.

A five-year-old or older machine should be compared with a modern unit, together with its initial cost, maintenance expenses and performance. The point is that present-day labor must be wisely employed and those machines which permit men to increase their production the most are the ones that ought to be used.

M/W Work Lagged Last Year

Year-end reviews and forecasts sometimes make pretty dull reading. What happened last year is already water over the dam, while any forecast of future events is subject to so many "ifs" it is of doubtful value. But it is something else when the figures tell a story of deep significance.

Let's see what is shown by the trend of railroad earnings and M/W expenses in 1955 and the prospects for 1956. Official figures for the first 10 months of last year indicate that operating revenues of Class I roads increased 7.5 per cent over 1954, while net went up 56 per cent.

To convert a 7.5-per cent increase in revenues into a 56-per cent increase in net income, it was necessary to keep a tight rein on operating expenses. For the first four months of 1955, M/W expenses were actually below 1954. For the year as a whole, they were up less than 2 per cent. The actual work done also reflects the tight-fisted policy that prevailed. The amount of new rail laid last year was actually less than in the recession year of 1954, while tie renewals climbed only 3.5 per cent above the

all-time low established in that year.

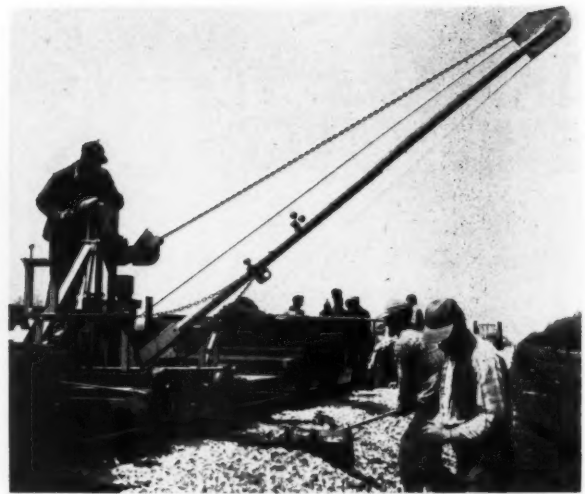
We can't help but conclude from these figures that the actual needs of the properties were not the prime consideration in determining M/W expenditures in 1955. As the traffic load becomes heavier the properties are bound to wear out faster. This is fundamental and elementary, but it seems to have been forgotten, at least temporarily, in some quarters last year. It is true that M/W budgets for that year were made up during a year of unsatisfactory business, but there is no reason why they could not have been revised upward more liberally as the business curve went up.

A bright spot in the picture is afforded by the overall plans of the railroads for 1956. On the basis of figures submitted by almost all of the Class I roads, it is estimated that new rail renewals will be 14 per cent above 1955, while tie renewals will increase 10 per cent. Even so, this important question remains to be answered: Are programs for 1956 sufficient to make up for work that wasn't done last year, and at the same time take care of current requirements?

Some Trends in 1955 . . .



BALLAST-regulating machinery such as this unit was purchased in large quantities last year.



MECHANIZATION of tie gangs occurred on a large scale. More tie-renewal machines were acquired than ever before.

Equipment Purchases Going Up . . .

● Increased earnings and widespread revision of maintenance practices are triggering the trend which has sent this year's budgets for purchases of M/W work equipment soaring toward a new record. Last year, the railroads of the United States, Canada and Mexico purchased some 7,100 units of work equipment at an estimated cost of \$18.75 million. Reports from roads regarding their plans for 1956 indicate the purchase of approximately 8,400 units of this equipment at an unprecedented cost of about \$23.5 million.

To ascertain the facts with respect to 1955 equipment purchases and budgets for 1956, *Railway Track and Structures* addressed a questionnaire to the officers of 458 railroads large and small in the three countries. These questionnaires were returned by 371 (81 per cent) of the roads addressed. Replies were received from all except two of the Class I line-haul and all except one of the Class I terminal and switching companies. Of the railroads submitting replies, 175 reported the purchase of 6,991 units of work equipment. With this figure as a base, it is estimated that the railroads as a whole purchased a total of 7,100 units of this equipment at an estimated cost of \$18.75 million last year. This compares with estimated purchases of 7,325 units in 1954 at a total cost of \$16.4 million. What these figures indicate is that during 1955

In 1955 the dollar value of M/W equipment purchases increased 14 per cent above 1954, but the number of units purchased showed a decline. Estimates for 1956, based on actual budgets of a number of roads, suggests a large increase in such purchases, possibly bringing them to a new high during the year.

there was a trend toward the larger and more expensive types of equipment.

The Picture for 1956

Eighty-six of the roads that answered the questionnaire submitted estimates of their proposed equipment purchases for 1956. Forty-seven of these indicated that they planned to buy more equipment, five said that they expected to spend the same, and 34 roads indicated that their 1956 purchases would be less than in 1955. These 86 roads purchased maintenance-of-way work equipment valued at \$8.87 million in 1955 and propose to spend an estimated \$12.23 million in 1956, an increase of 38 per cent.

What They Bought

The reported purchases of equipment during 1955 have been segregated into major categories in the table, which also gives the purchases reported in the same categories in 1954. Individual items of

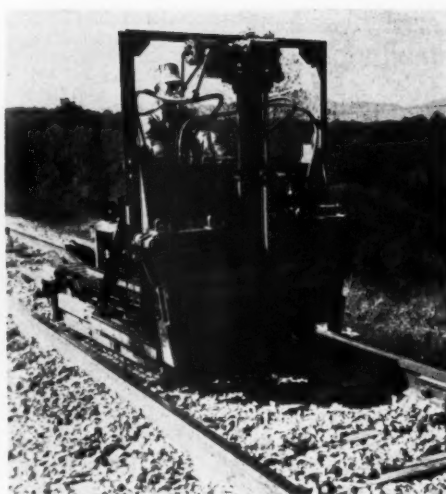
equipment are included in those categories with which they are most closely identified when working. For example, rail-laying cranes are included under rail-laying equipment and do not appear with other cranes. Those items which are adaptable to several uses in track work are included in "miscellaneous track equipment."

Again leading the field in total units purchased, as it has for many years, is equipment for the transportation of men and materials. Although the total units acquired in this category dropped below the total acquired in 1954, this shrinkage was entirely due to a reduction in purchases of track motor cars and accessories. Automotive vehicles showed a substantial increase. Specifically, purchases of passenger automobiles went up from 264 units to 320 and trucks from 779 to 1,057. On the other hand track motor cars dropped from 800 in 1954 to 652 in 1955.

One of the largest increases percentage-wise occurred in the amount of grading and earth-moving equipment acquired last year. Unit



SELF-PROPELLED jack carriers, which reverse themselves automatically when loading, are being used to carry jacks ahead of production tampers.



POWER track liners are already a widely accepted labor-saving device.

... 1956 Could Set New Record

purchases in this group increased from a total of 147 in 1954 to 228 in 1955. The items in this classification showing the most activity included bulldozers, up from 28 to 63 units; scrapers, up from 5 to 20; and tractors, including both crawler and wheeled types up from 37 to 61.

Tie Renewal Equipment Up

The largest single item of expense in the track-laying and surfacing account is that for the renewal of track ties. Considerable progress has been made in the organization and operation of tie-renewal gangs in an effort to lower the overall expense in connection with this operation. Reported purchases of equipment for outfitting such gangs increased from 96 units in 1954 to 149 last year. The number of tie-renewal machines acquired nearly trebled, rising from 33 units in 1954 to 98 in 1955.

Increase in On-Track Tampers

While purchases of ballasting and ballast-maintenance equipment dropped from a total of 903 units in 1954 to 786 in 1955, not all items in the group participated in the decline. Purchases of on-track tamping machines for example jumped from 23 units reported in 1954 to 101 in 1955. More units of this type were purchased last year than for any year since they

were separately classified in 1950. Other items in this field which are comparative newcomers are ballast regulators, cribbers (for cleaning full cribs) and ballast distributors. Purchases of machines of these types increased from 68 in 1954 to 137 in 1955.

Reported purchases of rail-laying equipment increased 76 units in 1955 to reach a total of 684 units. Conspicuous in this group were purchases of spike pullers and drivers, power track brooms and cribbing machines for rail laying. As a group within the larger classification 397 such units were acquired against only 150 in 1954.

Purchases in the miscellaneous track equipment group increased by 63 units above 1954. One of the machines in this group, the power track liner, which was first reported as a separate item in 1954, was an outstanding favorite. From a meager 12 units in 1954, purchases of these machines increased almost eleven-fold to 131 units in 1955.

A number of Mexican railroads have embarked on large-scale, long-range programs aimed at complete rehabilitation and modernization of their properties. Even with less expensive labor available, these roads are finding it advantageous to use modern maintenance-of-way equipment. This was evidenced by replies to the questionnaire received from 7 Mexican railroads. Four of these roads reported the purchase of 211 units of equipment at a cost

of \$590,000. Based on their reports of proposed purchases in 1956, it is estimated that these roads will spend approximately \$1.1 million for approximately 400 units of equipment this year.

A total of 32 railroads reported that they had used rented equipment to a greater or less extent during 1955. One of these roads reported that practically all of its maintenance work was done with equipment obtained on the rental basis. In reports covering 1954 operations, only 23 railroads reported the use of rented equipment. This would indicate a trend toward the use of such equipment. However, because of the varying bases used in reporting this practice, it was not possible to correlate the various items reported for comparison purposes.

Purchases of Work Equipment

Category	Number of Units	
	1954	1955
Ballasting Equipment	903	786
Bridge & Building Tools and Equipment	592	564
Cranes	42	40
Grading Equipment	147	228
Miscellaneous Track Equipment	617	680
Power Plants	233	365
Rail-Laying Equipment	608	684
Tie-Renewal Equipment	96	149
Transportation of Men and Materials	3470	3070
Weed-Control Equipment	110	149
Unclassified Items	439	276
Total Units Reported	7257	6991

Loading,
Hauling,
Unloading . . .



1 Welded rail is pushed onto a string of flat cars. It is supported on the cars by an assembly of roller-bearing rollers on a common shaft mounted, one to a car, behind one of the car's trucks. An adjustable threader on a dummy flat car aids in properly aligning rail as it is loaded.



2 A train of 31 specially fitted flat cars, with a capacity of 12 strings of rail each 1440 ft (37 rails) long, easily accommodates itself to track alignment as it snakes around curves. Rail is anchored on only one car at middle of train. Thus, any change in rail length due to temperature or movement of rail due to track curvature or train action is compensated by free movement of rail ends.

How Santa Fe Lays Long Rails

With several hundred track-miles of continuous rail scheduled to be laid each year on the Santa Fe, the handling of this rail into the track has gotten to be a man-sized job. To perform the task the road has worked out a system and an organization that function with the efficiency of a well-oiled machine.

● During the last two years the Santa Fe has laid 142 track-miles of continuous welded rail and in 1956 it plans to lay nearly 250 track-miles. It necessarily follows that the road has given much study to the problem of how to handle such rail with maximum efficiency from the time it comes from the production line at the welding set-up until it has been placed in the track.

During the 1955 working season, when the road laid 103 track-miles of continuous rail, several extra gangs of approximately 100 men each were utilized for this purpose. As to be expected, the work is highly mechanized, using many of the same types of machines that are employed in laying standard-length rails. The organization of one of these gangs is given in the table. Other gangs varied only in the distribution of men in carrying out some of the manual operations.

Production of each of the rail gangs averages about a track-mile per day.

For fabricating continuous rails the Santa Fe used both the oxyacetylene pressure-welding process and the Matisa-Schlatter flash butt-welding process (*RT&S*, July 1955). Standard practice is to weld the rails into lengths of 1440 ft. The story of how the long pieces are transported and laid begins as they come from the production lines at the welding machines.

Loaded on Special Flat Cars

The practice invariably is to load the long rails directly onto a string of 31 specially equipped flat cars. Two of these trains are required for each production line; while one is being loaded the other is transporting its load to the site of installation.

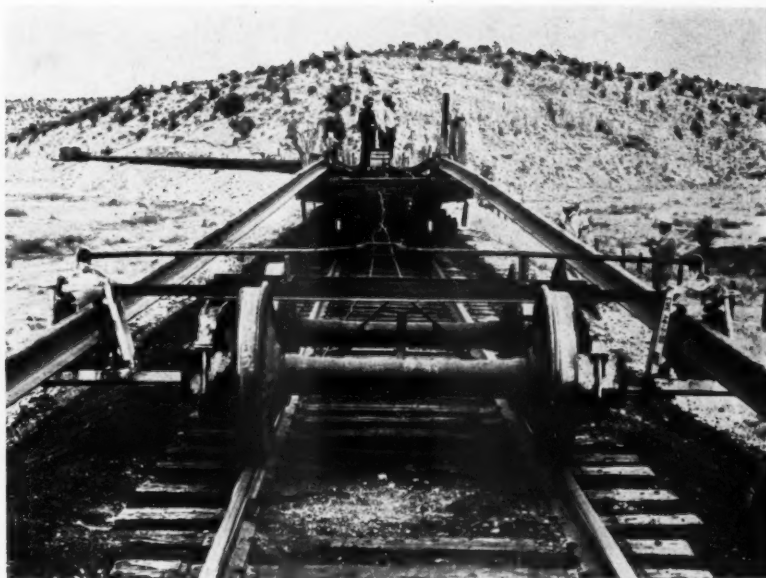
Each of the special flat cars is fitted with a single assembly made up of 12 specially designed roller-bearing rollers on a single shaft to support the 12 rails that are carried at a time. These assemblies are mounted just behind one of the car's trucks. The individual rollers in each assembly are separated from each other by vertical steel plates all welded to a plate attached to the floor of the car. These separators prevent lateral movement of the rail but do not restrict its longitudinal movement. In effect each rail is "pigeonholed" as it is placed on the train.

A dummy flat car, spotted between the end of the rail train and the production line, is equipped with an adjustable threading device that can be moved laterally across the car as desired. By means of the threader the rails are guided into the proper pigeonholes on the rail train. The head end of each rail is temporarily fitted with a special shoe which prevents its digging into the car floors as it moves along. A man with a bar guides the shoe as it reaches the rollers on each car to insure that the rail stays in its pigeonhole. Rails are pushed

(Continued on page 30)



3 During unloading operations a member of the train crew, equipped with a walkie-talkie set, maintains constant communication with the head end of work train. This eliminates hand signals and increases safety and speed of unloading.



4 Two rails are unloaded simultaneously. They are guided by threaders mounted on either corner of last rail car. A "caisson," towed about 50 ft behind rail cars, supports two other threaders, mounted on an outrigger frame, through which the rails are guided to the ground at toe of ballast shoulder or in center of intertrack space. Hand brake on caisson can be set to maintain drag and prevent "run-up" of caisson during unloading operation.

Laying operation includes use of special and standard equipment . . .



5 Threader suspended from boom of Burro crane or Speed-Swing is started over one end of rail to be moved to center of track just before arrival of steel gang. This device, which moves along the rail, makes it unnecessary to repeatedly hook and unhook rail tongs during shifting operation.



6 As crane moves down track shifting rail to center, two men with bars follow closely behind to steady rail so that it stands erect. These men also line out any irregularities which might interfere with the operation of machines during rail-laying operations.



7&8 After rail has been set into center of track, tie plugs are distributed and two power wrenches, working in tandem, remove nuts from track bolts. These are followed by a pair of Nordberg mechanical spike pullers (Photo No. 7, left), each machine pulling spikes from every other tie. Following spike pullers a gang of 14 men pull spikes missed by spike pullers, knock off joints, bar out old rail, throw out scrap, set and drive tie plugs, and drive "deadheads"—broken spikes. Two cribbing machines then remove high ballast from between ties.



9 Two men, one with a hoe and the other with a broom, follow closely behind the cribbers and clean any loose ballast from the top of ties in advance of the adzers. Three Nordberg adzers operate as a team (above), to smooth ties and provide a solid surface to receive the tie plates.

onto the train by the winch which propels them along the welding line.

During transportation, the rail is anchored only on the car at the center of the train by a series of clamping plates bearing on the tops of the rails. This permits the free ends of the rails to move under conditions of varying temperature and operation. To act as safety buffers in case operating emergencies should result in longitudinal shifting of the rails, a car of ballast is placed at either end of the string of rail cars. So that it will be available for use as required during un-

loading operations, a crane is usually hauled on a flat car behind the locomotive and is set out at the closest siding to the unloading site. There the crane is unloaded with the help of a portable ramp.

How It Is Unloaded

The locomotive and caboose of the work train are equipped with railroad radio. During unloading operations a member of the train crew equipped with a walkie-talkie set is stationed at the rear end of the string of cars and maintains constant communication with

the locomotive engineer. This eliminates the need for passing hand signals to govern train movements during the unloading of the rail and greatly expedites this operation even under the most adverse operating conditions.

Rails are unloaded two at a time. The crane which accompanied the work train makes the pull necessary to land the ends of the rails on the ground as the train moves out from under them. The crane holds the rails until a sufficient length has been unloaded to resist the pull of the train. Each succeeding rail is connected to the preceding one by fish plates and is pulled off the train in sequence.

Threaders Simplify Unloading

As rails leave the train they pass through threaders mounted on each corner of the end car. They then run through threaders mounted on outrigger frames carried by a "caisson." This is made from an old freight-car truck and is towed by cable about 50 ft behind the last rail car. It is equipped with a hand-brake that can be set to maintain sufficient drag to prevent it from "running up" on the rail cars when it is in use. The outriggers are adjustable so that the threader on each side can be set 6 to 7 ft from the center of the track.

Use of the threaders on the caisson makes it possible to drop the rail being unloaded at the toe of the ballast shoulder or in the center of



10 Before the tie plates are placed, the adzed surfaces of the ties are covered with a coat of hot creosote. Here, a Fairmont tie sprayer is applying this coating. The machine trips automatically at each tie as it is pushed along. Also used is a Santa Fe-built machine on which the operator rides and depresses a lever to open and close the spray over each tie.



11 A gang of five men place tie plates on ties behind the spraying operation. These are followed by a plate-lining machine (above), built by the Santa Fe, which aids in positioning plates and distributes studs used in gaging operations.

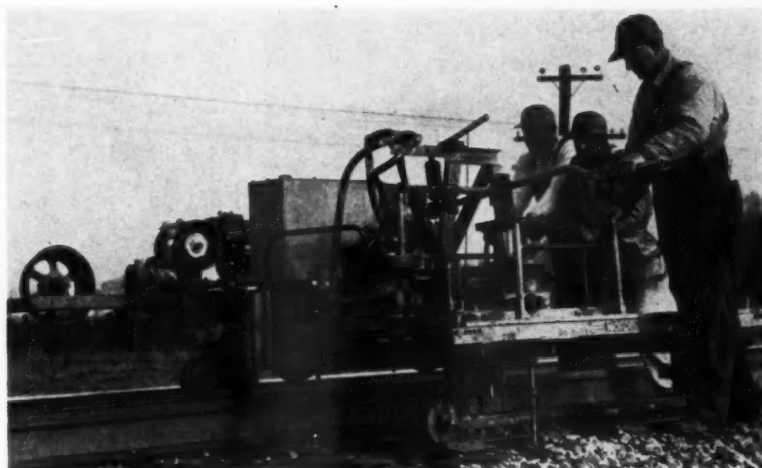
Organization for Laying Welded Rail

Supervision

- 1 Assistant roadmaster
- 1 Foreman
- 2 Assistant foremen

Operation

	Mach. Oper.	Laborers
Removing bond wires, crossing plank, motor-car set-offs, etc.	—	12
Removing rail anchors	—	2
Placing welded rail in center of track with crane	1	1
Distributing tie plugs	—	3
Two power wrenches removing track bolts	2	2
Two spike pullers removing track spikes	1	6
Pulling spikes missed by machines	—	1
Knocking off joint bars	—	1
Barring out old rail	—	3
Throwing out scrap material	—	3
Setting tie plugs	—	2
Driving tie plugs	—	1
Driving down broken spikes	—	1
Removing crib ballast with router or cribber	1	2
Cleaning ballast from ties	—	2
Adzing ties with three adzers	1	6
Spraying creosote on ties	—	2
Setting tie plates on ties	—	3
Using plate-lining machine. (One of these men also distributes studs for gaging)	—	3
Gaging with machine	1	2
Setting studs for anchoring plates on every fifth tie	—	1
Driving hold-down studs	—	2
Setting rail onto tie plates with crane	1	1
Sawing rail for joints as required	—	2
Distributing track spikes	—	2
Setting and starting track spikes	—	6-8
Driving spikes with air hammers (When dual spike drivers are used this is reduced to 2 laborers in addition to machine operator)	1	10
Straightening tie plates and driving missed spikes	—	2
Distributing rail anchors	—	4
Installing rail anchors	—	6-10
Drilling holes and installing joints	—	2
Carrying water	—	2
Attending camp	—	3
Totals	9	94-100



12 Gaging is done with a Nordberg Dun-Rite gaging machine. This machine accurately positions the tie plates so that when the rail is placed between the shoulders of the plates the head-to-head gage is correct. Holes are drilled through the anchor holes of plates in every fifth tie as machine moves along.

the inter-track space where it is out of the way until required in the rail-laying operation. At farm or unpaved crossings trenches are made to receive the long rails, which are filled in around the rail after it has been unloaded. At paved crossings, the welded rail is dropped and then pulled back clear of the crossing if the end of the string is within 5 or 10 standard rail lengths of the crossing. Otherwise the rail is flame cut, at a location outside the crossing, and is then pulled back to clear the highway. Before the cut ends are joined with angle bars in connection with the

rail-laying operation the portions affected by the heat of cutting are sawed off.

On arrival of the steel gang, the first operation is the removal of rail anchors, bond wires, crossing plank and motor-car set-offs throughout the distance where the rail is to be renewed. A crane then sets the new rail into the center of the track. An unusual feature of this operation is the use of a threader suspended from the boom of the crane. With the rail inserted into the threader the crane backs down the track, literally pulling the rail into the center of the track as it



13 To anchor plates on every fifth tie Racor studs are driven into holes bored in them. The track is then ready to receive the welded rail which is moved to position on the tie plates from the center of track with the aid of a Burro crane operating on the rails or . . .



14 . . . A Speed Swing which straddles the track while placing rail. Two men follow the actual rail-laying operation distributing spikes; behind them 6 to 8 men set those spikes. No hand gaging is necessary and spikes are driven by a ten-man gang equipped with air-powered spike drivers or . . .



15 . . . Two Racor Dual spike drivers. Each machine drives both an inside and an outside spike simultaneously. These drivers are air powered from a track-mounted air compressor placed between the two drivers. Following the spike driving, a gang of 16 men straightens crooked tie plates, drives missed spikes and installs rail anchors.

runs through the threader. Tie plugs are then distributed, bolts and spikes are removed by machines, rail joints are knocked off, the old rail is barred out and all old scrap is removed and thrown to one side of the rail zone.

The next step is to remove high crib ballast from between the ties in the rail zone using a cribber or router. This machine is followed by a battery of three adzers which prepares the ties for the tie plates. A creosote spraying machine follows the adzers, placing a seal coat of creosote on the adzed surfaces of the ties, after which the new tie plates are placed.

This operation is followed by a Santa Fe-built machine, called a pre-gager or plate liner, which is used to aline the tie plates to approximate gage for the gaging ma-

chine which follows. The gager accurately positions the plates so that when the rail is set the head-to-head gage will be correct. Every fifth tie is bored by this machine to receive two anchor studs. The plates so anchored position the rail accurately so that hand gaging is unnecessary.

A crane is used to set the rail from the center of the track onto the tie plates. Regular rail tongs are used in this operation.

Lengths Not Tailored

The Santa Fe makes no effort to tailor the rail lengths to fit particular locations. Whenever conditions require installation of an insulated joint or switch, the welded rail is cut in the field to fit. A short piece of rail is cut-in on either side of

each insulated joint. This permits repairs and adjustments to be made at these points without disturbing the welded rail proper. A rail saw accompanies the rail crane and is used for cutting-in joints as required. Turnouts are installed either before or after the welded rail is laid as conditions demand.

Following the placing of the rail it is spiked up and the rail anchors are placed. Rail anchorage is supplied by boxing every other tie. Standard joint bars are applied to connect the long lengths.

Generally the track in which rail is to be renewed is raised out of face and ties are renewed in advance of the rail-renewal operation. After the rail has been laid a Jackson Track Maintainer spots up the loose ties and completes the operation.



STEAM JET at 120 psi is directed onto the switch-plate surfaces and under the switch point, as well as into the flangeway between the point and stock rail.

Steam Bath For Switch Plates

● The Illinois Central has conducted a test, using live steam at 120 psi pressure, to clean old oil and dirt from switch plates prior to the initial application of a new graphite type lubricant. The result was a saving in time compared with previous hand methods of cleaning. Use of the new type lubricant not only provides uniformly easy operation of the switches, but also saves time compared with frequent oiling.

The steam was supplied by a portable oil-fired steam cleaner, manufactured by the Vapor Heating Corporation, and known as the Vapor Upgrader Junior Model 5090. This device includes a 6-gal fuel oil tank, and a small gasoline engine to drive the power pump and blower. The cleaner, mounted in a housing on a hand dolly with rubber-tired wheels, weighs a total of 275 lb. For the test, this steam cleaner was placed on a track push car on which was mounted two 55-gal steel drums for water supply. From a cold-water start, the forced draft oil burner is said to produce steam within 20 sec and to deliver volume steam, at up to 120 psi, within 3 min.

As an aid in breaking down the heavily caked layers of old oil and dirt on switch plates, "Blast" detergent cleaning compound, made by the Du Bois Company, was injected into the steam flow in the steam gun. For each gallon of water supplied to the cleaner, about 2 ounces of detergent is fed to the steam gun.

One man, who had no previous experience, cleaned the bottoms of the switch points and the 22 slide plates on each No. 18 switch in 20 min. To do as good a job as possible by hand methods on each switch would re-



PORTABLE steam cleaning machine and two 55-gal drums for water supply are mounted temporarily on a push car for movement to the eight switches used in the test.



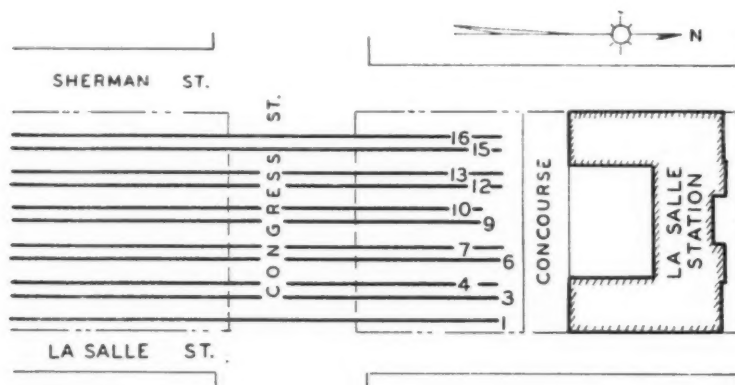
LUBRICANT, with a graphite base, is applied with a brush and quickly dries to a tack-free surface that will not pick up and hold dust or sand blown by wind and trains.

quire the same man 2½ hr of scraping, washing, burning and sweeping. When the steam cleaning was complete, a dry rag was used to wipe off any dampness, and after a few minutes drying time, a liquid graphite base lubricant was applied with a brush. This lubricant quickly dries to a tack-free film that will not pick up and hold dust or sand blown by winds or passing trains. Having once cleaned the old oil from plates, and having applied this new graphite base lubricant, subsequent applications can be made after just sweeping the plates.

This test led to several conclusions: (1) The steam cleaning method is more efficient than hand cleaning by scraping and sweeping; (2) Use of the lightweight, portable, oil-fired steam cleaner is practicable either on a track push car with water drums, or, where water is available from a hose, the generator could be used as an off-track unit and pushed by hand.



FACILITIES below the station tracks were rearranged and a veritable forest of columns supporting the track structure was removed. Here is shown the west entrance of the Congress Street superhighway under the La Salle Street station.



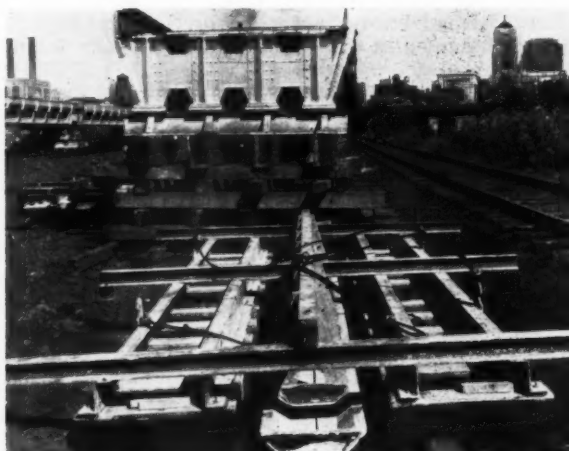
WEST ROUTE superhighway (Congress St.) will pass under station's 11 tracks.

The trainshed of the La Salle Street Station at Chicago is right in the path of the new Congress Street Superhighway being built to expedite traffic to and from the western parts of the city. Bridge spans to carry the station tracks over the highway had to be installed without interference with normal movements of passengers and trains. The ingenious system that has been worked out for installing the spans is proving highly satisfactory.

Spans Completed Near Station . . .



STEEL SPANS for tracks and platforms are completed in construction yard near station. Spans are waterproofed and heavy wire reinforcing mesh placed before pouring concrete.



DECK FORMS, which include the permanent cross-tie sections, drainage canal depression, and the supporting cross-beams, are completely assembled on the ground in 20-ft sections and . . .

This Is What Happens

When a Highway Meets a Station

● How do you project a superhighway 116 ft wide under an 11-track station layout without serious interference with train movements and other services? To complicate the problem further assume that the area at street level under the tracks is occupied by various facilities and is also a veritable forest of columns supporting the track structure.

That's the situation facing engineers who tackled the problem of extending Chicago's West Route Superhighway, better known as the Congress Street Superhighway, under the tracks of the La Salle Street station which is owned jointly by the New York Central and the Rock Island. In this station the tracks are elevated 15 ft above the street level. To allow space for facilities beneath the track level the tracks were supported on a series of plate girders carried on columns spaced 15 ft and 30 ft apart in one direction and 12 ft and 24 ft apart in the other. The facilities occupying this space included taxicab driveways, passenger transfer service, baggage, mail and express handling operations and numerous other services.

Work Planned Years Ago

Planning for the section of the superhighway that will extend under the station got underway in 1939. By 1943 there was general

agreement between the City of Chicago and the two railroads as to the method to be used in carrying the tracks over the superhighway.

Two 44-Ft Roadways

The design of the superhighway proper calls for the eastbound and westbound roadways to be 44 ft wide. There will be an 8-ft median strip within the railroad station limits and there will be 10-ft side-walks. In the space beneath the proposed eastbound roadway there is a section of the Congress Street subway which was constructed during the first phase of the project. Railroad traffic will be carried over the superhighway by a series of 60-ft deck-type beam spans. There will be two spans for each of the 11 station tracks and 2 lighter spans for each of the 6 station platforms, making a total of 34 bridges. These spans will be supported on concrete piers, which have been built. The footings for these piers are resting on caissons which bear on hardpan 70 ft below existing street level. Caissons for the center and south piers were built in 1947 just prior to the construction of the subway tube which they straddle. The north line of caissons was completed in 1951.

Prior to construction of the piers it was necessary to rearrange the facilities at street level underneath the tracks. At the present time the

project as a whole has been brought to the final and most critical phase—removal of the present track structure and its supports and the installation of the beam spans.

The major consideration which has made this project so unusual is that all essential operations of the railroads have had to be adequately maintained throughout the entire construction period. At the track level there are approximately 9,000 train movements monthly, involving in excess of 130,000 railroad cars which transport over 1,000,000 passengers. These same trains handle great amounts of baggage, express and mail. These operations utilize 11 tracks and 6 platforms.

Restrictions for Contractor

To maintain railroad service without serious interruption and to complete the work in the shortest time consistent with economy, the contractor was asked to comply with several restrictions. First, he must not take more than two tracks out of service at any time. The trackage to be taken out of service includes 120 ft of rail from the bumping posts to the north side of the superhighway, 120 ft of rail over the roadways and 40 ft of rail immediately south of Congress street. These 280 ft of track deprive the station of $3\frac{1}{2}$ car lengths for each track not in operation.

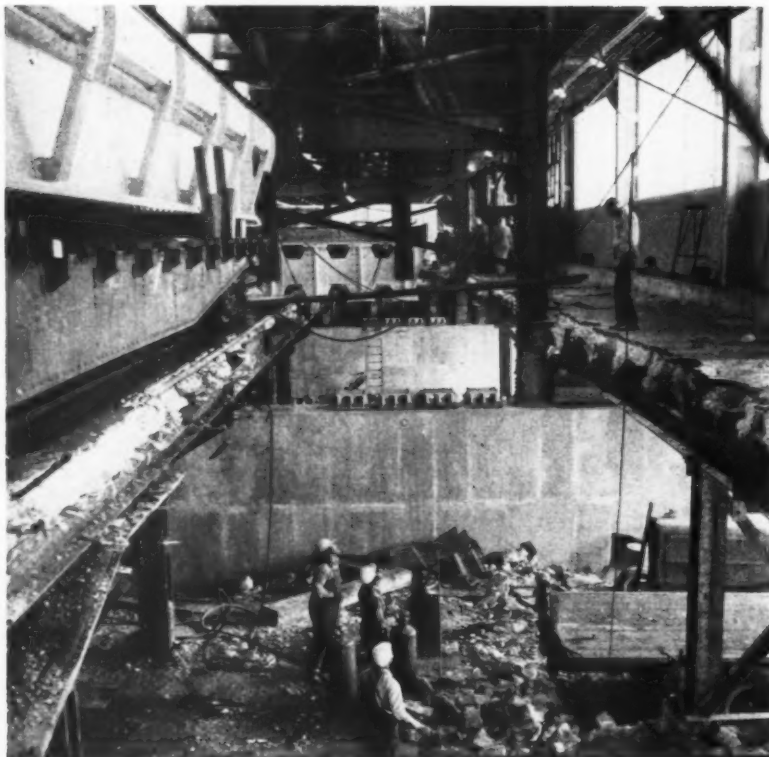


... LIFTED into place with a large mobile crane. After concrete is set and forms removed, the concrete is allowed to cure.



COMPLETED span is ready for loading onto a flat car and movement to job site in the station. Two temporary tracks were built to serve the construction yard and tie into the adjacent railroad yard.

How They Were Placed . . .



TWO TRACKS are taken out of service and barricades are constructed. One track and its supporting structure are removed while the adjacent track is used as a "work" track. Flat cars, carrying the new spans, are spotted with their ends directly under the jacking beams. Hanger plates are attached and the span is lifted slightly by means of pneumatic jacks so the flat car can be removed.

Secondly, the contractor must completely enclose the 280 lin ft of working area with solid barricades 8 ft in height. This is to protect the public and prevent interference with normal station operations by discouraging sidewalk superintendents from blocking station platforms. More important, however, these barricades provide the contractor with an enclosure within which he may work during any hours he chooses and within which he may store his construction materials and equipment. The contractor is thus able to schedule his operations to his best advantage. The working area provided is 30 ft wide and encompasses two tracks for the length indicated above.

No Work During Holidays

Another restriction, occasioned by heavy passenger, mail and express operations during the Thanksgiving and Christmas Holiday season, was that all station tracks and platforms must be in service for their entire lengths during the period beginning November 15 and ending January 10. The contractor, therefore, was not permitted to begin any operation involving the track or platform structures which he could not complete by November 15.

Finally, it is incumbent upon the contractor to complete the renewal of the track and platform struc-



JACKING the span horizontally until it is directly over the seats is accomplished by two 15-ton track jacks working in tandem on each of the two jack beams.



PNEUMATICALLY operated jacks are located inside each of the four jacking columns. The jacks are supported by blocking and two 3-in diameter steel pins inserted through column.

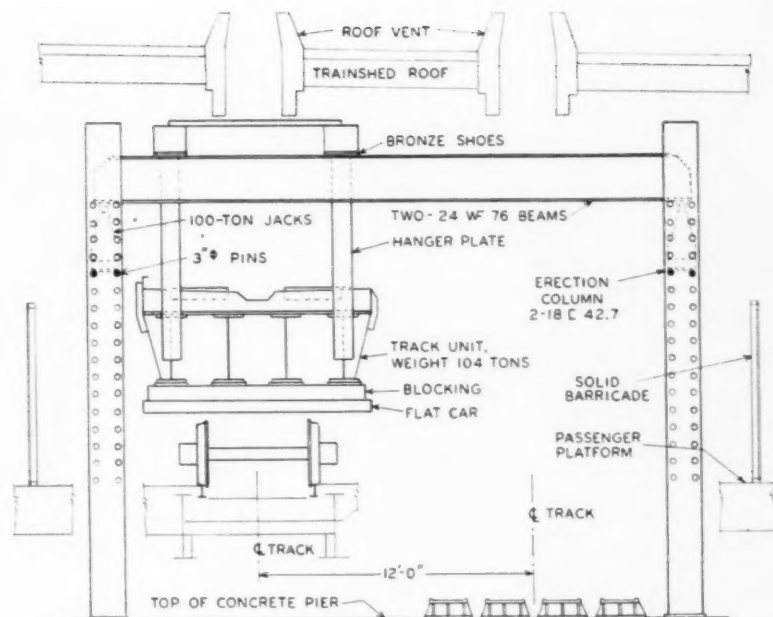
tures with the maximum time of tracks out of service limited to a total of 180 calendar days. Since there are approximately six repetitive operations, the contractor's progress can be accurately gauged and, should he begin to fall behind on his schedule, he will be required to increase his working hours until he is again on schedule.

After considerable study by the engineers of the City of Chicago and the railroads, a feasible solution to the problem, consistent with the restrictions, was evolved and included in the contract documents as a suggested method of procedure. The low successful bidder, the James McHugh Construction Company, Chicago, has elected to follow the suggested method.

How It Is Being Done

The steel for the track and platform units is fabricated at the American Bridge Company's plant at Gary, Ind. The track and platform spans are then shipped to Chicago where they are completed in a construction yard furnished by the railroads, which is located a short distance from LaSalle Street station. Two temporary construction tracks have been built which tie into the adjacent railroad yard.

When a pair of spans is ready to be installed the contractor is permitted to take two station tracks out of service and begin construction of



CROSS SECTION of erection equipment used in placing the new 104-ton spans. Bronze shoes are used to facilitate the horizontal movement of the span.

the necessary barricades. After the barricades are in place, one of the two out-of-service tracks and its supporting structure are removed while the other remains to serve as a "work" track. The erection equipment (see drawing) consisting of jacking columns, jacking beams and hanger plate assemblies is then set in position. Next, one of the track

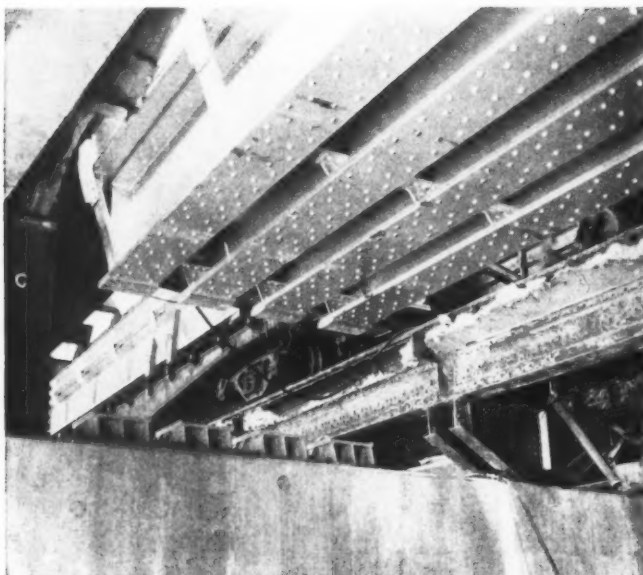
spans, weighing 104 tons, is loaded onto a flat car in the construction yard and is brought into the railroad station on the "work" track which is adjacent to an open hole previously made in the track structure.

The new span is spotted with its ends directly under the jacking beams. The hanger plates are then



MOVING OF SPAN a distance of 12 ft sideways is required before the operation of lowering the spans can begin. Frequent resetting of the track jacks used is necessary. Here is a view

showing the arrangement of jacks, jacking columns, beams and hanger plates used to set the spans. The span has been moved about half of the required distance.



POSITIONED directly above its final resting place, the span is now being lowered a distance of about 10 ft to the seats.



RESTORED TRACK becomes the "work" track so the previously used "work" track can be removed.

fastened to the ends of the track spans; one hanger plate at each corner. By means of 100-ton pneumatically operated jacks located inside each of the four jacking columns, the jacking beams are raised slightly permitting the removal of the flat car. Next, through the use of two 15-ton track jacks mounted on top of each jacking beam, the hanger plate assemblies are moved 12 ft sideways until the track span is located directly above its final position.

After this, the jacking beams are lowered about 10 ft until the track span is seated. A second span is then positioned on the "work" track and is similarly set in place. Rails are then spiked on the new track structures. This newly restored track now becomes the "work" track and the previously used "work" track and its supporting structure are removed and two additional track spans are set into position using the same procedure. A service walk suspended between adjacent track spans is then constructed.

The first pair of tracks were taken out of service on September 14, 1955, and the first track span was set in position on September 30. The contractor's operations are proceeding from west to east within the station.

Installing Platform Spans

After the construction of a pair of tracks with their supporting

structures, the contractor temporarily omits the installation of a platform and proceeds to renew the next easterly pair of tracks and their supporting structures. Following this operation the platform temporarily omitted, together with the two immediately adjacent newly installed tracks, are taken out of service. A temporary platform is then laid on one of the out-of-service tracks while the other track now serves as a "work" track. The existing platform span is then removed and railroad operations which previously utilized this platform are detoured over the temporary walkway. A platform span, fabricated in the construction yard and weighing approximately 50 tons, is loaded onto a flat car and is brought into the station preceded and followed by self-propelled steam operated 50-ton cranes.

Through the use of specially designed short booms (vertical clearance within the station is limited to 16 ft), the platform span is set into position by the cranes. This process is again repeated with a second platform span.

Following the general procedure as outlined the 22 track spans and 12 platform spans, which will replace the existing structure over the proposed superhighway, will be set into place. At the conclusion of this work, the roadways will be ready for paving and a most critical operation involved by the construction of the Congress Street Superhighway will have been completed.

The plans for this project, the re-

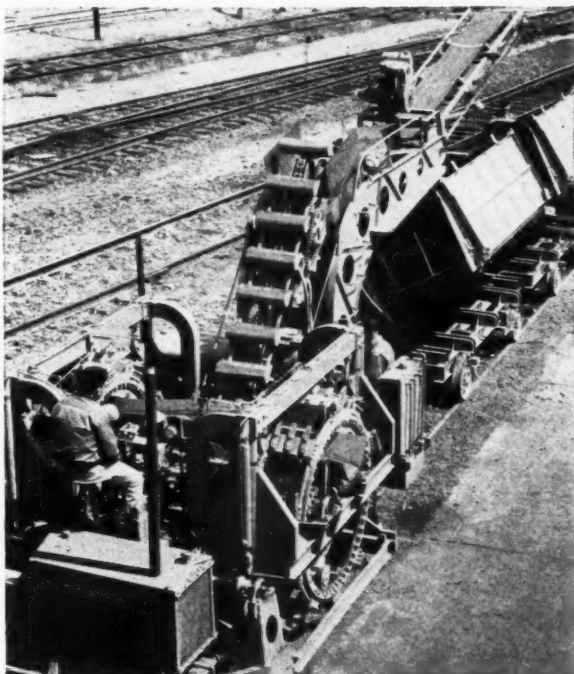
construction of the track structure of the La Salle Street station over the Congress Street Superhighway, were prepared by the Bureau of Engineering, Department of Public Works, City of Chicago, with the close assistance of the New York Central and the Rock Island. F. H. Simpson is chief engineer for the New York Central and W. B. Throckmorton is chief engineer for the Rock Island.

For Chicago, Walter E. Rasmus, assistant chief engineer, was in direct charge in the preparation of the design plans, with Al Butler, head of the structural section, and P. Solheim, designer, responsible for the structural design. For the railroads, G. E. Robinson, engineer of structures, NYC, was in direct charge of the work, M. J. Plumb and Milton Pikarsky, assistant engineers, NYC, were responsible for the structural design. Mr. Pikarsky served as liaison between the city and the railroads.

The steel erector is the F. K. Ketler Company, Chicago. F. K. Ketler, president, E. S. Joehnk, chief engineer, and Dan Johnson, general superintendent, are responsible for the creation of the erection equipment described in the article.

Construction is under the general supervision of J. Walter Grimm, assistant chief engineer, City of Chicago. A. J. Kinder is the resident engineer for the city. Mr. Pikarsky is engineer in charge for the railroad companies, with G. P. Wright of the Rock Island Lines assisting.

Ballast Scoop . . .



MACHINE is used to remove foul ballast from tracks in tunnels. Wheel on either side of the unit digs and passes the ballast to an endless belt which carries it to dump cars.

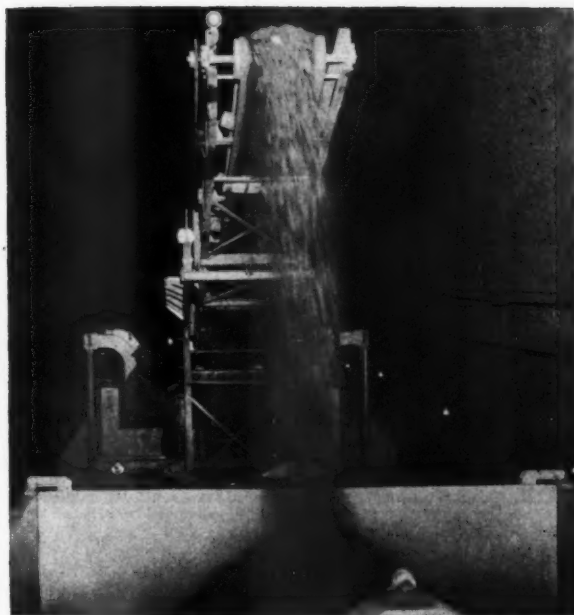
● A machine for use primarily in removing foul ballast in the close confines of tunnels has been built by the Southern Pacific in the road's shops at West Oakland, Cal. The road has numerous tunnels in which the task of removing old and foul ballast was becoming expensive in the face of rising labor costs. In the past, it was the practice to loosen the ballast with hand shovels, load it in wheelbarrows, and dispose of it outside of the tunnel.

The new machine is a rail-mounted, self-propelled unit with hydraulically controlled digging wheels on each side. A series of conveyor belts and bucket-equipped chains are so arranged to carry the ballast to the rear where it is deposited in two rail-mounted dump cars. The dump cars, which are also self-propelled, are used to transport the ballast to the dumping point.

How the Machine Is Used

At the job location, the operator of the machine positions the digging wheels over the ballast strip at the end of the cross-ties. The wheels, which rotate independently, are then lowered $4\frac{1}{2}$ in into the ballast which is loosened and lifted to a cross-conveyor belt. This belt deposits the ballast in a hopper where buckets on an endless chain carry it to another conveyor belt and into the two dump cars behind the machine.

When the dump cars are filled they are taken out of the tunnel for dumping. Together, these cars can carry 21 cu yd of material. After the machine has passed, the ballast in the center of the track is transferred, by hand or suitable machine, to the cleaned



FOUL BALLAST is being loaded into self-propelled dump cars from endless belt on the digging unit. On second pass ballast shovelled from cribs is picked up.

. . . For Close-Quarter Work in Tunnels



SELF-PROPELLED dump cars, independent of the digging machine, carry material out of the tunnel for disposal. The power unit on the lead car operates the tilting mechanism.

strips left by the machine. The machine then makes a second trip through the tunnel picking up this additional old ballast and digging down another $3\frac{1}{2}$ in. When this operation is completed the track is ready for the application of clean ballast.

First Test Is a Success

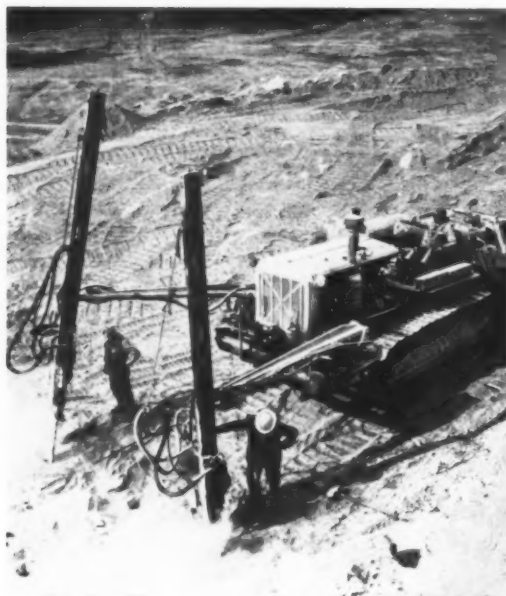
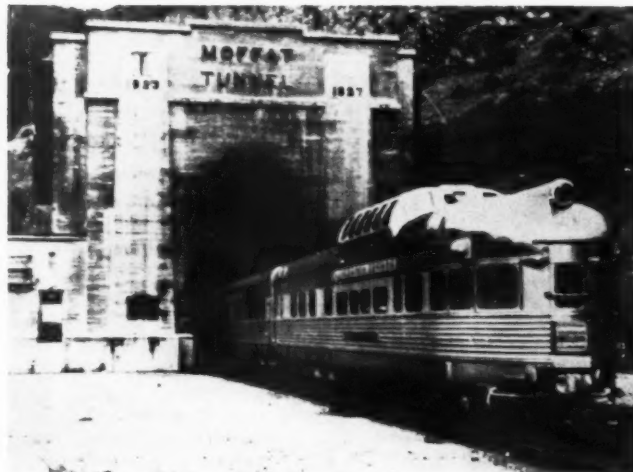
The machine was given its first job in the 1.3 mile long tunnel near Newhall, Cal., on the road's Los Angeles division. The test was a success. The machine was said to be able to clear the roadway of foul ballast at the rate of 450 ft an hour. Each dumping of the cars averaged about 20 min. Officers of the road state that the machine will cut ballast-digging costs appreciably. At present the unit is assigned for snow-shed work.



CLEARANCE CAR, designed to measure clearances on the New York Central, has 120 wooden feelers. When the car is driven by a close clearance the feelers are pushed back so the outline of the structure is reproduced. Each feeler is then touched (left) by a large pantograph attached to a small pantograph (above) which in turn reproduces the outline on a chart to scale.

News Briefs in Pictures . . .

PROTECTIVE HOODS are being installed in 30 tunnels used by the Denver & Rio Grande Western to divert corrosive drippings from the track and streamlined trains. Corrugated metal sheets, supported by corrosion resistant bearing plates and pipe standards, carry the aggressive sulphides away from the track area.



LINE CHANGE on the Northern Pacific near Homestake, Mont., is part of the road's program for the elimination of tunnels. The reason for the program is that tunnels require too much maintenance. Here a Caterpillar D8 tractor with Gardner-Denver compressor and drill unit is used for drilling 12-ft holes for shooting rock.



HEAVY RAIL traffic, which keeps guard gates down for long periods and causes severe automobile congestion, has prompted a grade elimination project on the Boston & Maine at Winchester, Mass. Steel sheet piling, rented from L. B. Foster Company, were driven for earth support during construction of ten required bridges. The present track level will be raised 18 ft.



WHAT'S THE ANSWER?...

... a forum on track, bridge, building and water service problems

Making Fence Repairs

Should fence repairs be made by section forces or by gangs specially organized for that purpose? Why? When should this work be done? Explain.

Let Sections Do Minor Repairs

By R. H. PEAK

Division Engineer, Illinois Central,
New Orleans, La.

It would be my opinion that the answer to the question would depend entirely upon the amount of repairs necessary. It would seem that section forces could ordinarily take care of minor month-to-month repairs. When any major rebuilding is necessary, due to either deterioration, to changes of line or other physical change in the fence location, this would have to be done by B&B gangs under the terms of brotherhood agreements. The question of whether this work should be done by a regular B&B gang or a gang specially organized for the purpose would once again depend upon the amount of work and also upon the availability of B&B gangs. There is nothing highly specialized about fence construction and repair.

Fence Gangs More Economical

By W. A. SCHUBERT

Division Engineer, St. Louis-San
Francisco, Chaffee, Mo.

Roadmasters and others in charge of maintenance forces will agree that section gangs are already overloaded with many jobs which cut down their efficiency in maintaining their section to a high standard. This is particularly true since many of the jobs they have to do are unproductive insofar as they concern maintenance of track. However, these jobs still have to be done by section gangs because of the precedents that have been established. I am speaking of gen-

eral yard cleaning, unloading station coal, handling grain doors, etc. If any work of this type can be taken from the section gang they could devote more time to track maintenance.

Right-of-way fence repairs fall under this category. My trouble as roadmaster was that section forces did not have time to repair fences and would not do so until some stock was killed or the adjacent landowner complained about fence conditions. Then, because of other pressing work, only the most necessary repairs would be made. As a result fences were never stock-proof. Meanwhile other fences on the section also deteriorated, cattle

would be turned into pasture on short notice and then all other work would have to be stopped to repair fences to avoid stock claims.

The method of doing the work with section gangs is uneconomical. It is, in my opinion, advantageous from the standpoint of efficiency and economy to repair or rebuild fences with an established fence gang which is equipped to build fences. This fence gang should be supplied with power equipment for digging post holes, for clearing timber from the fence row and with a post driver for use wherever necessary. A specialized gang of this type can do the work more economically and a good fence, complying with established standards, will be the result.

The gang should be mobile and housed in camp cars or trailers. The work should be programmed and done out of face. A program should be made up taking into consideration climatic and ground conditions so that the gang can work

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered in the April Issue

1. What are the relative advantages of the portable percussion punch for making bolt holes in rail? Disadvantages? Are the bolt holes thus formed more, or less, prone to develop bolt-hole cracks than drilled holes? What safety precautions must be observed in the operation of this device?

2. Should the hot-water heating systems used in stations and other buildings be drained at the close of the heating system? Why? Explain.

3. Track gradients in retarder yards are subject to changes due to settlement and other causes. These have an effect on the speeds of cars being classified after they pass the retarders. What can be done to insure that the gradients of these tracks are maintained within design limits? How often should they be

checked? How can this check best be made?

4. What is the most effective and economical type of bulkhead construction at the ends of timber bridges and trestles? What factors affect this choice? Why? Explain.

5. On branch lines where traffic is relatively light and sections are long, section forces are sometimes reduced to the foreman alone. Under these circumstances, how should track inspections be carried out?

6. To what extent, if any, can the wear in pipe lines serving sanding facilities be reduced by lowering the operating pressure of the air? By reducing the size of the pipe? By both? What are the relative advantages and disadvantages of these methods? Why? Explain.

on low ground during the dry season and on high ground during the wet season. Then the gang will not be delayed by standing water on the right of way.

With the present cost of labor, specialized gangs are highly important. A fence gang is one that will pay off in more economically constructed and better fences. This will reduce stock claims, which are unquestionably high, and save wasted money badly needed for productive maintenance work. It will eliminate train delays because of stock orders and prevent possible derailments resulting from stock being struck by trains. Last, but not least, such a gang would help us retain the good will of the farmer who does not want his stock killed.

Organize Fence-Repair Gangs

By T. J. BARCIO

Roadmaster, Chicago & North Western,
Sparta, Wis.

It is my opinion, since most railroads are probably extending the territories assigned to each section crew and reducing these crews in manpower, that section crews today have all they can do to carry out their regular track maintenance work. This leaves little, if any, time for such work as fence maintenance.

I would say that comparatively small organized fence-repair crews should be formed on a system basis. These crews should be equipped with bunk and material cars and be sent out as early in the spring as possible. They should work north as the spring advances, rebuilding right-of-way fences as required. These crews should have with them the material needed to carry out the work. They should be organized and experienced in rebuilding fences. They would be able to stay at this work and make considerably faster progress than a section crew. Each section foreman should, of course, have a schedule of the fencing that is to be done on his section.

Right-of-way fences on most of my territory are very old and a lot of them are in need of rebuilding. Each section foreman should decide each year on which portion of his territory fence rebuilding is most essential. In that way his fences could be completely rebuilt over a few years and would then last for many years to come.

This method would eliminate the necessity of each section foreman ordering considerable fence material which he would probably allow to lie around for some time before he was able to get at fence-repair work. The material would then probably be used to patch up certain sections of right-of-way fence, where needed most, using time that should be spent on heavy spring track work, tie installations, etc.

In my opinion fencing work should be done as early in the spring as possible, especially in districts where winter snows are heavy.

The snow, spring thaws and rains do considerable damage to fences and repairs should be made before farmers put their stock out to pasture. Fencing is easier to carry out when vegetation is down before the start of the spring growing season.

Emergency repairs to right-of-way fences should be carried out by local section crews whenever necessity arises as a result of flood damage, trees blown down, etc. However, for extensive fence repairs or rebuilding, a fencing gang would be more practical. After a number of years of fence rebuilding on a district or subdivision the fences would be in good shape and the gang would not be needed again for many years.

Uses Section Forces

By F. J. CAVAN

Division Engineer, Lehigh Valley,
Buffalo, N. Y.

On the Lehigh Valley, fence repairs are made by section forces. We feel this is the most economical manner of maintaining fences, our section headquarters all being centrally located.

Extensive fence repairs are made only when requested by the adjoining property owners. The reason for this is that we have considerable right of way which is farmed and where no fencing is required.

Our section forces do, of course, make minor repairs to the fences as they observe defects incident to their routine duties and we give preferred attention to fence protecting lands used for pasturing.

We do not use specially organized gangs because we feel there would be too much time consumed in traveling from their headquarters.

Depends on Amount of Repairs

By L. P. DREW

Assistant Chief Engineer, Union Pacific,
Omaha, Nebr.

The decision as to whether fence repairs are to be made by regular section forces or by special fence gangs depends on the amount of repairs required.

If repairs are only of a minor nature and scattered over an entire district or division, it is usually more economical to have this work handled by regular section forces. These forces are constantly on the ground and can pick up minor repairs at odd times without serious interference with their regular track-maintenance duties.

If repairs are of a major nature, practically involving reconstruction, it is far more desirable and economical to organize a regular fence gang. These men should be recruited from maintenance-of-way forces, preferably from among those who have had previous experience in fence work. Before long this gang will become very proficient and the cost of repairs will be correspondingly less as they progress.

This latter method of handling does not interfere with regular track maintenance as would be the case when regular section gangs are used for the work.

Fence repairs, like most maintenance work, should of course be performed at a time when weather conditions are favorable. However, it is not impossible nor uneconomical to do some parts of fence work during the winter months. The exception, of course, being the setting of posts. This should be done when the ground is not frozen.

In some cases snow fences, of wire-lath type, are erected in the fall. This would be an opportune time to handle fence repairs through the same area.

Use Fence Gangs in Winter

By H. T. ALDRIDGE

Section Foreman, Norfolk & Western,
Glasgow, Va.

Having been foreman of small utility forces and section forces I have been able to view this problem from different angles.

Small fence repairs should be made by regular section forces while working over their sections.

Obviously such forces should also take care of all emergency fence repairs.

With such a procedure, however, every few years a district or even a division comes to need general overhauling of fences throughout. When conditions reach this point a fence gang should be organized

and equipped to put all fences in first-class condition. General fencing by section forces in this day of long sections and small forces is out of the question.

General fencing by a force assigned for such work should always be done in winter. At this time there are always furloughed sec-

tion men and others who can be given work. This holds our experienced track men who might otherwise be lured away by other industry. Likewise, other types of work such as ballasting, etc., are at a standstill in winter, and men normally employed in regular maintenance are available for fencing.

Installing Bumping Posts in Buildings

When bumping posts are installed at the ends of stub tracks in passenger stations, freighthouses and shop buildings, what should be the minimum distance between the striking plates of the posts and the walls beyond the ends of the tracks? Why? Explain.

Buffer Zone Necessary

By W. F. ARMSTRONG
Architectural Engineer, Chicago &
North Western, Chicago

Bumping posts installed at ends of stub tracks in passenger stations and freighthouses sometimes fail to completely stop cars being shoved into those stub tracks. It is therefore good practice to have any wall at some distance beyond the striking plate of a bumping post. This will prevent damage to the wall if a car breaks through or climbs over

the top of a bumping post. The layout of stub-type passenger terminals or freighthouses usually calls for a platform connecting the ends of platforms between the tracks. This platform provides a buffer zone between bumping post and wall. The exact distance is hard to determine; but 20 ft should be a satisfactory minimum.

Shop buildings offer a somewhat different problem. I know of no roundhouse using bumping posts. However, various types of stop blocks have been used. Even these sometimes fail to prevent locomo-

tives from going through the back wall.

A stub-type diesel shop should have bumping posts on maintenance tracks. The usual layout provides for a platform at the ends of stub tracks between the bumping post and wall. Generally bumping posts are not installed in the heavy repair section, as they interfere with shop operations.

Car shops generally do not have bumping posts, but it is well to leave an aisle 10 to 20 ft wide at the ends of the tracks. This serves as a trucking area and buffer zone between the ends of the tracks and the wall. Cars are generally moved into this type of shop at slow speed by car pullers.

If it is not practical to provide any distance between bumping post and wall, the wall should be a non-bearing wall that can be easily repaired and of a type of construction that can be broken without damage to the remainder.

Power Tools for Welders

Where trucks are assigned to track welders, what power tools should be furnished them as standard equipment? Why? Explain.

Gives Detailed Recommendation

By R. A. HOSTETTER
General Superintendent of Maintenance
& Work Equipment & Scales, Texas
& New Orleans, Houston, Tex.

The Texas & New Orleans assigned trucks to electric welders engaged in repairing manganese crossing frogs and certain switch work; also to single-unit oxyacetylene welders assigned to frog and switch work and the building up of rail ends at various locations. The following are our recommendations:

Electric Welders: Single-unit electric welders should be furnished a 1½ or 2-ton truck with

special body having waterproof trays on each side for storage of tools and welding electrodes. A 200-amp welding machine should be mounted behind the cab so it can be easily removed from the truck to a track pushcar for movement to locations which are inaccessible by truck.

A built-in well should be provided for acetylene and oxygen cylinders, leaving as much space as possible for an open truck-bed platform which should be covered with sheet steel. A steel box should be placed across the front end of the truck bed where electric-welding cable can be coiled and locked up when not in use. There should be sufficient room in this locker so

that other items such as seat cushions, welding shields, etc., can be left on top of cable and also be locked up overnight.

The remaining open truck-bed space should be utilized for carrying miscellaneous items such as a compact flexible-shaft grinder or larger type grinder if needed. A hand winch may be provided at the front of the body for use in pulling heavy equipment up skid rails into the truck body. A small portable 26-cu ft compressor can be used to advantage for shipping, driving rivets, tamping, swinging cross timbers, etc.

For single-unit electric welders covering extensive territories, it is advantageous to provide a house trailer which can be towed by truck. This will effect a considerable saving when an electric welder and one helper or grinder operator are used for doing preventive maintenance on manganese frogs and crossings.

Large electric rail-end welding

gangs using welding machines, generally moved on track, do not operate as economically as smaller electric welding units handled by truck at this time.

Oxy-acetylene Welding Gangs: The one-welder oxy-acetylene gang assigned to repair frogs and build up rail ends should be furnished a $\frac{3}{4}$ or 1½-ton truck with special body for carrying tools and gas cylinders. Provision should also be made to carry a small flexible-shaft grinder, a portable 36-cu ft air compressor, a small portable gasoline-engine rail drill and other tools required.

In some instances it may be advantageous to provide a small trailer for transporting gas cylinders. This trailer can be left on the job. Such trailers are more advantageous for use with multiple gas-welder gangs, especially where rail-end work is the principal assignment. Where terrain on the right of way is rough, a small tractor may be used to advantage to tow the gas-cylinder trailer.

As is true with the electric welding gangs, providing a house trailer may result in economies when oxy-acetylene welders are employed over extensive territories.

Those Needed for Better Work

By D. J. BELL

Welding Inspector, St. Louis-San Francisco, Springfield, Mo.

Where trucks are assigned to track welders, they should be provided with any power tool that will expedite the work and effect a saving to the railroad in maintenance as well as producing a better class of work.

The track welder should be provided with a portable power drill. This will enable him to perform drilling operations that otherwise could be only half done. This includes full drilling of all angle bars when changing out rail, frogs and switch points. It is the custom on several railroads for the track welder to make parts for yard frogs and switches and also gage plates and head rods. A power drill used on this work can be a big money saver for the maintenance supervisor.

On railroads where rail cannot be cut with the oxy-acetylene cutting torch because of rules against this practice, the welder should be provided with a power saw. This

will enable him to make all the cuts necessary for laying switches and renewal of short lengths of rail. As a general rule the track welder follows the Sperry car on its test over the railroad and the power saw can speed up the work, to a great extent, when change-out rail has to be cut.

A portable power grinder such as a utility grinder is almost a must with the track welder whether he is working from a truck or motor car. The rail end, frog or crossing will stand up much better when ground to a true straight-edge surface. The grinder can also be used to prolong the life of stock rails, switch points, frogs, railroad crossings and to grind rail ends that have been cut with the torch.

The track welder should be provided with an electric welding machine to enable him to do this type of work in the field as well as in the shop. With the general trend toward manganese-type frogs, railroad crossings, yard guard rails, switch-point protectors and insert-type switch points, an electric welding machine is almost an essential. All track parts of these type must be built up with the electric arc.

In lieu of contracting arc-welding work, use of a track welder will show a great saving on repairs to any type of frog or switch. We now have twenty-six electric-welding units assigned to track welders and they are building up manganese as well as open-hearth and heat-treated frogs, crossings, switch points, guard rail, rail ends and gage plates.

We have 33 utility grinders assigned to track welders and 26 to the electric welders. Almost all of our track welders are assigned a portable power drill.

It is my thought that a track welder that has a truck should have any power equipment that could influence the production of more and better work.

Suggests Grinders Only

By BERNARD GEIER

Engineer of Equipment & Design, Delaware, Lackawanna & Western, Scranton, Pa.

The only power tools which I can see should be assigned to track welders equipped with trucks would be a combination surface and cross grinder for rail ends and

a grinder for switch points and frogs.

The above pieces of equipment, with a portable electric welder and acetylene outfit with cutting attachments, etc., should cover the job sufficiently.

Prefers Generator-Powered Tools

By A. W. MUNT

Supervisor of Work Equipment, Canadian Pacific, Toronto, Ont.

If electric welding is to be carried out, the following power tools would be required:

(1) A skid-mounted, portable 300-amp. 60-volt dc electric welding unit, equipped with a 5-kw, 125-volt dc auxiliary generator for operation of grinders and other accessories. The unit should be equipped with a panel board complete with voltmeter, ammeter, automatic cutouts, plug receptacles, etc.

(2) A 3-hp, 110-volt dc electrically-driven rail-surface grinding unit mounted in a frame equipped with track wheels. This unit would be used for grinding off rail welds or for grinding off welds on frog crossings, etc.

(3) Two 110-volt, ac-dc portable 6-in diameter hand grinders. These are used for finishing off rail welds, trimming flangeways of frogs, etc., and for slotting rail ends and grinding out defective metal prior to welding.

(4) An oxy-acetylene cutting outfit. This is used for cutting out defective metal in frog castings prior to welding, etc.

Electric welding units should be equipped with necessary lengths of 2/0, S/C welding cable. The lengths of these cables will depend upon the estimated distance the machine will be from the work. The same would also apply to the electrically operated grinders.

The use of electrically operated grinders with electric-welding units should result in the most economical arrangement and operation, as only one power-plant is required to operate all the tools.

If oxyacetylene welding is to be carried out it is our opinion that a gas-engine-driven generator of 5 KW capacity could be carried in the truck to supply the current for operating the same electric grinders that are used for grinding off electric welds. Portable electric hand grinders in the 6-in size are a most versatile unit for welding crews. They cannot be conveniently driven by a gas engine as they would then be too heavy and cumbersome to handle. The electrically

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What's the Answer (Cont'd)

driven, rail-surface grinder is much lighter in weight than the gas-

engine-driven grinder and is much easier for two men to handle when removing it from the track.

It is felt that a most efficient

welding crew set-up can be organized if they are equipped with electrically powered tools mentioned above.

Inspection of Cables

How often should the cables of cranes, derricks or pile drivers be inspected? What factors determine when these cables should be replaced? What precautions must be taken to assure proper installation of the cables? Explain.

Make Daily Inspection

By W. E. CHAPMAN

Superintendent of Maintenance, Central of Georgia, Savannah, Ga.

The cables of cranes, derricks or pile drivers should be inspected daily when the machine is in use as flaws, kinks, defects and excessive lengthening can develop quickly.

If machines are not in use, cables should be inspected carefully after the last use and any defective ones should be replaced promptly and then inspected periodically thereafter, say every three months, to be sure that all are in place and in good condition for emergency use.

When cables are in use, excess flattening, lengthening or kinking, breaking of strands and slipping of moulded zinc in sockets may possibly occur. For these reasons steps must be taken to inspect cables as frequently as possible during the day, as well as at the end or at the beginning of the days work.

Rope stretch is, in my opinion, the most critical criteria for determining cable replacement as it is a result of the breaking of strands, and the breaking of strands is an approach to the danger point.

Any rope which has come into contact with intense heat, as by contacting electric wires or such, should be replaced immediately.

Any rope that has been badly kinked should be replaced and any cable that has broken strands, whether on the drum, or in the sheaves or at intermediate points, should be replaced.

Any indication of slippage, in or breaking of the zinc moulding in the sockets, should be corrected immediately.

The proper installation of cable is of the utmost importance and the rules must be carefully checked and applied. To this end, the following rules should be observed:

(1) All cable should be properly unrolled or uncoiled so as to prevent kinks.

(2) Be sure that cable is of the proper size and strength for the job. See that all drums and sheaves are not grooved, marked or scored, and if so, have them machined to a smooth or proper surface.

(3) See that the rope is properly wound on the drum. The correct way is to start a right-hand-lay rope from the right flange of the drum and a left-hand-lay rope from the left flange of the drum and proceed with even, smooth winding.

(4) See that attachments are properly placed and fastened, that all sheaves are in proper line, and that the sockets are on straight.

(5) Properly oil cable and sheaves and see that they are kept so oiled.

Regular Inspection Important

By R. E. BERGGREN

Supervisor Maintenance of Way Equipment, Illinois Central, Chicago

Wire rope or steel cable is a broad subject and one that has been discussed and written about at great length in a variety of publications as well as in bulletins devoted exclusively to the one subject. The inspection of wire rope in use is usually made to suit conditions. This is true when the rope is on cranes, derricks or pile drivers in railroad use.

Cable breakage can cause serious accidents and loss of life so regular inspection to suit service conditions is important. The machine operator is usually aware of this and does make inspections accordingly. Machines, when new, are equipped with rope of a size which provides a safety factor of 5 or 6 to 1 so that, after the original inspection, the ropes need be in-

spected only weekly in normal "one-shift" service. As ropes wear the time between inspections is reduced so that these inspections eventually become a daily procedure until the ropes are replaced. Emphasis should be placed on careful observation of those sections of the rope subject to excessive abrasion, twisting or kinking, such as the portion passing through multiple sheaves in a clamshell bucket or the portion at or near a fitting such as a socket. These points should be inspected daily whether the rope is new or worn.

Experienced operators schedule inspections of rope to suit service conditions as well as the conditions created by lubrication and the original application of the rope. Generally there should never be periods longer than one week between inspections of rope on machines in regular service. Common sense and experience are the best tools of inspection.

The principal factors that determine when wire rope should be renewed are the number of broken wires and the wear. Since about half of the wire rope strength is in the outer wires, it is important to know the number of broken wires in all strands within one rope lay (this is the distance along the rope required for one strand to encircle the rope). From this, the remaining wire strength can be determined. The amount of wear on the outer wires can also be determined by careful measurement. Other factors which determine replacement are defects caused from the use of incorrect rope or incorrect application of the rope, use or care of the rope which may result in crushing, kinking, birdcaging, corrosion, etc.

The installation of wire rope on machines should be made from a reel or coil which is free to rotate as the rope unwinds. An unreeling strand or a shaft supported by two jacks or horses is satisfactory as this permits the rope to be unwound and fed through the sheaves. The natural bend in the rope from the reel then continues through and winds on the drum unkinked. If installation is properly made there will be no kinking throughout the life of the rope. This method also eliminates to a



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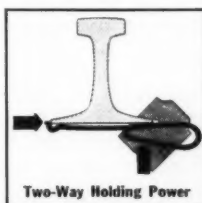
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What's the Answer (Cont'd)

great extent the crossing of the rope on the drum thereby preventing this type of crushing. If unwinding reels are not available and it is necessary to unwind the coil as it is fed into the sheaves, it should be done with the reel toward the machine to take advantage of the natural bend in the rope. The coil should never be laid flat on the ground when the wire rope is being installed.

Careful Inspection Is Insurance

By E. M. ENGER

Supervisor Bridges & Buildings, Chicago,
St. Paul, Minneapolis & Omaha,
St. Paul, Minn.

Safety, of course, is the prime factor that motivates concern for the condition of cables in use on any machine. A few simple rules, if religiously followed, will generally keep anyone out of trouble from most causes of cable failure.

We have found that a close inspection, at least once each quar-

ter, of cables that are subjected to fairly uniform loading and usage, well within their ratings, will afford insurance against cable failures. Things that must be looked for are broken strands, corrosion, mechanical wear at points of contact with sheaves or drums, and loosening of clips or other types of anchorage. These periodic inspections not only insure against failure but very often permit cables to be reversed, before excessive wear at contact points weakens the cable, and thus doubles its useful life. This type of inspection refers to cables of machines such as pile drivers and certain types of stationary cranes and derricks.

Load lines and boom cables of boom cranes such as are used in railroad service, we believe, are subject to more severe usage and strains than the cables of most other machines in use. This is due to the versatility of this type of machine and the wide range of work they are called upon to perform. They are often overloaded on lifts and heavily strained on pulls. It should be the practice to examine the cables of this type of machine each time they have been subjected to overload or strain or after each

severe tour of duty and, at the least, each time that the machine is serviced and greased. Such cables should be replaced if strands are found to be broken, if there is evidence of excessive corrosion or wear or if there are signs of fraying.

When new cables are installed it is very important that the ends be securely seized to prevent raveling before the fittings are applied and that the cable is properly removed from the cable reel to prevent kink or curls. Care must also be taken to make sure that lines are not crossed and that there are no broken, rough or misaligned sheaves. On load lines especially, it is important that the cable be very carefully applied to the drum and secured so that there will be no crossing of lines on the drum. It is very good practice, after a new line has been installed, to break it in under light loading so that the strands will have an opportunity to adjust themselves to operating conditions. After this has been done all fastenings should again be checked to make sure none has worked loose. Just a little time spent in breaking in the cable will pay many times over in increased cable life.

Controlling Work-Train Movements

Should the movement of work trains on the job be controlled by the supervisor in charge of the work train or the train crew? If the train crew, what liaison should be established between the supervisor and the crew to prevent misunderstanding? Explain.

Team Play Is Essential

By L. C. BLANCHARD

Roadmaster, Chicago, Milwaukee, St. Paul
& Pacific, Minneapolis, Minn.

Work-train crews are responsible to the track, bridge or signal department supervisor insofar as the accomplishment of work is concerned. Train crews are responsible for the protection of their train at all times and for the safe movement of it from one location to another.

When the supervisor is with the work train, he should take time to explain to both the conductor and the engineer just what moves he has in mind and how those moves are to be made. We have in mind the different instructions that would be required for unloading ballast, rip rap or cross-ties, or han-

dling of snow-fighting equipment.

If the supervisor is starting a job on which he has had no previous experience, he should explain to the train crew that, since the work is new to all of them, they should start out in a manner designed to be safe with the thought of making necessary changes as they go along. Nothing is worse than starting a job one way and then changing without first explaining the reason to the train crew. Such a procedure leads to temper tantrums that are never of any benefit to the work at hand. Team play is the essential ingredient for successful work-train operation.

Sometimes the supervisor cannot be with the work train. In that case he should go over the work very carefully with the work-train crew and any other personnel on the train such as crane operators,

ditcher operators, snow-fighting operators, etc., to insure a clear understanding of the work to be done, then leave the matter in the hands of the work-train conductor. Good results usually follow.

Train Crew to Pass Signals

By W. E. CHAPMAN

Superintendent of Maintenance, Central
of Georgia, Savannah, Ga.

The movement of work trains on the job should, at all times, be controlled by the train crew, but as directed by the supervisor in charge.

The train crew receives their orders or signals from their foreman or conductor, as the case may be, and the foreman or conductor receives his instructions from the supervisor in charge.

To do a proper job, the foreman or conductor must be in touch with the supervisor at all times. He should always be within talking distance of the supervisor, so that the supervisor's instructions may be clearly heard and understood.

The foreman or conductor will



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What's the Answer (Cont'd)

so place the members of the train crew that his signals or orders will be seen or heard and be transmitted clearly to the engineman for execution.

The supervisor is usually busy watching all phases of the current work and cannot devote time to moving the train except through the few words necessary to tell the foreman or conductor what the next move or moves should be. Too, this is the proper chain of command as only one person should instruct the crew and that person should be the man in charge of the crew. To do otherwise would invite misunderstanding, accidents and injuries.

Supervisor Directs Conductor

By R. W. PUTNAM

Engineer Maintenance of Way & Structures, Southern Pacific,
San Francisco, Cal.

In performing work involving a work train, arrangements for handling the train should be directed by the supervisor or his representative and not left merely to the train crew. However, the actual movements of the train from one point to another must, of course, be made by the conductor of the train through authority of the dispatcher.

The supervisor's job is to pro-

gress the work all possible, whether it be picking up or unloading material, ditcher work, plowing snow, etc.

It is his duty to keep the conductor advised as to the movements he wants to make. The conductor's job is to see that he has authority from the dispatcher to make such moves. Where ordinary ditching work is being done the ditcher engineer usually keeps the conductor advised as to locations where he wishes to ditch. As a rule in these cases there is no supervisor with the train but, in effect, the ditcher engineer is his representative.

Very few conductors in this day and age will take a work train out and accomplish everything that should be accomplished unless there is a supervisor along to push the work and eliminate delays as much as possible. In some cases it is possible to change the program slightly to eliminate delays and it is the supervisor's duty to do this. Much more work can be accomplished if the supervisor programs the work and keeps the conductor of the work train advised concerning the next move to be made.

Control by the Train Crew

By T. M. VON SPRECKEN

Assistant to Chief Engineer, Southern,
Washington, D. C.

The movement of the work train

should be controlled by the train crew.

Fundamentally, the best way to control the movement of work trains is by means of direct communication to the engineer—usually by signals—from the supervisor in charge of the work without passing them through a third party. This will minimize the time lag between the giving of the signal and execution of the desired movement. This would give closer control. Whenever a direction or signal is relayed there is some lag and the possibility of misunderstanding is increased.

There are, however, practical difficulties in such handling. Among these are:

(1) Some of the signals of the supervisor might be wrongly given or misunderstood.

(2) A conductor is responsible for the safe operation of the train. He is also familiar with the crew and his signals will generally be recognized more promptly and clearly by the engineer.

(3) The engineer is more apt to follow directions exactly if they are given by the conductor.

Everything considered, it will be best to have the conductor give the signals to the train crew.

To insure success it is essential that the supervisor keep the conductor fully informed of his plans. He should arrange for the conductor to stay as close to him as practicable at all times.

By cooperation and full understanding, team work will be developed to accomplish safe and successful operations.

Hardness of Diesel Cooling Water

What is the minimum practical standard of hardness of water used in the cooling systems of diesel locomotives? In steam generators? What, if any, are the advantages of so-called "zero" water? Its disadvantages? Explain.

Hardness Is Only One Factor

By T. A. TENNYSON

Chief Chemist, St. Louis Southwestern,
Mt. Pleasant, Tex.

In the operation of diesel locomotives it is very important that the engine-cooling systems function properly to prevent overheating which can lead to any number of engine troubles and costly repairs. A number of factors, of which the hardness of the water is one, contribute to this program but

it is desirable to control as many of them as possible.

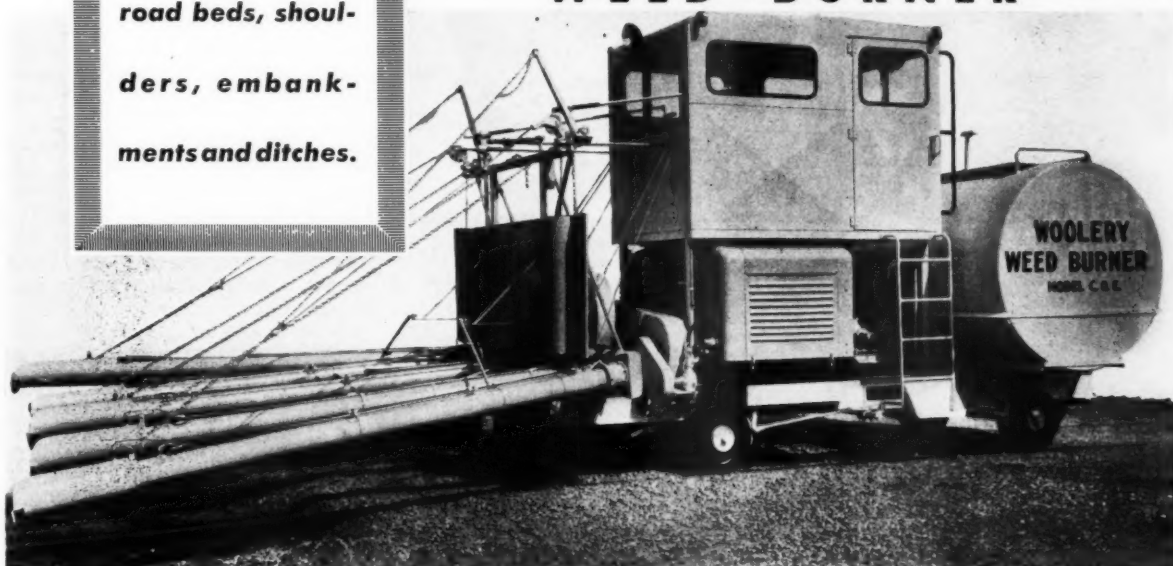
Cooling systems will not function properly if the heat-exchange surfaces are coated with an insulating material, if water passages are partially or completely obstructed or if loss of metal has produced leaks so that the proper volume of water or correct chemical treatment cannot be maintained in the system. Hardness of the water can be a factor in the insulation of the surfaces and obstruction of the water passages but prevention of

loss of metal through corrosion requires the use and careful control of an effective inhibitor regardless of the hardness of the water.

Heat-exchange surfaces in cooling systems can be insulated on the water side by scale consisting essentially of compounds of calcium and magnesium, by oil which has contaminated the water, by dirt which has been allowed to accumulate in the system, by a combination of oil and either or both of these, and by a combination of oil and rust. If the water in the cooling system is treated with an alkaline type inhibitor then the calcium and magnesium represented by the hardness of the water is precipitated as a sludge. If oil is present it can combine with this sludge to form a sticky insulating material. As far as insulation of the heating surfaces is concerned the

**Destroys all types
of vegetation on
road beds, shoul-
ders, embank-
ments and ditches.**

THE **NEW WOOLERY HEAVY-DUTY WEED-BURNER**



THE MANY ADVANCED FEATURES of the Model C.O.E. Woolery Weed Burner are a culmination of 30 years experience gained since the first Woolery Weed Burner was put in service on a major road in 1925.

TORQUE CONVERTER DRIVE on propelling engine gives exact speed of travel required for any conditions.

ELECTRIC IGNITION TO ALL FIVE BURNER HEADS. Firesist alloy steel burner heads. Burners can be used individually or all five together as required. The two outer burners can be swung in or out, raised or lowered, from the cab while the machine is in operation.

ALL STEEL CAB. Doors can be fastened in half-open position to deflect heat and scoop air in for ventilation.

TWO ENTIRELY SEPARATE BRAKING SYSTEMS—Power Brakes for service use—Separate manual brakes for parking or emergency.

DESIGNED FOR EASE OF MAINTENANCE, drive chains and sprockets are located outside of wheels for quick adjustment, inspection or replacement.

CHOICE OF 3 MAKES OF ENGINES available to meet the preference of the buyer.

OTHER WOOLERY WEED BURNERS available in 3-burner, 2-burner or 1-burner.

Literature and specifications on request.

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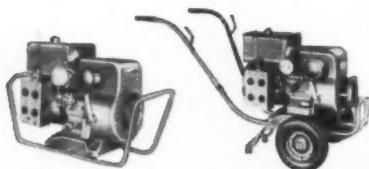
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Also manufacturers of Woolery Tie Cutters, Tie End Removers, Bolt Tighteners, Spike Drivers, Track Tool Transporters, Motor Cars and Joint Oilers.

More Power, Lighter Weight, More Compact Powered by dependable 4-cycle engines



Model 205AJ
2,500 watts A.C.



CARRYING FRAME for
hand lifting and moving.

TWO-WHEEL DOLLY for
easy moving by one man.

Put more power on the job!

These new power-packed electric plants are smaller . . . lighter . . . easier to take along and move around. Model 205AJ shown here weighs only 154 pounds . . . yet it develops 2,500 watts A.C.

Multiple receptacles allow direct plug-in of several floodlights or heavy-duty electric tools, supplying a whole crew with labor-saving electric power.

These new plants are completely Onan-built with Onan engines direct-connected to Onan generators for trouble-free long life. Carrying frames and two-wheel dollies are optional equipment.

Onan Portable Electric Plants: 500 to 5,000 watts.



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Q & C Step Joints are available for all the new sections of rail. Allowance for wear on old rails can be made to provide a smooth riding surface.

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What's the Answer (Cont'd)

hardness which can be tolerated in the cooling water depends a great deal on the quality of maintenance of the cooling systems.

Water passages in the engine-cooling systems, such as those in the radiators, are small and can be obstructed by sludge formed in the cooling system by precipitation of the calcium and magnesium represented by the hardness of the water if the sludge is in sufficient amount and proper state. Dirt, rubber, oil, corrosion products (rust) and a combination of any two or all of them will also obstruct these water passages. Thus, while the hardness of the water plays a part in the obstruction of water passages it is not the only thing involved. However, the hardness of the water is important in the sludge problem since each grain per gallon hardness represents a potential one-seventh pound of sludge in a thousand gallons of water.

Hardness standards for cooling water vary up to a maximum of around 5 grains per gallon but we still prefer to use water with as near zero hardness as possible.

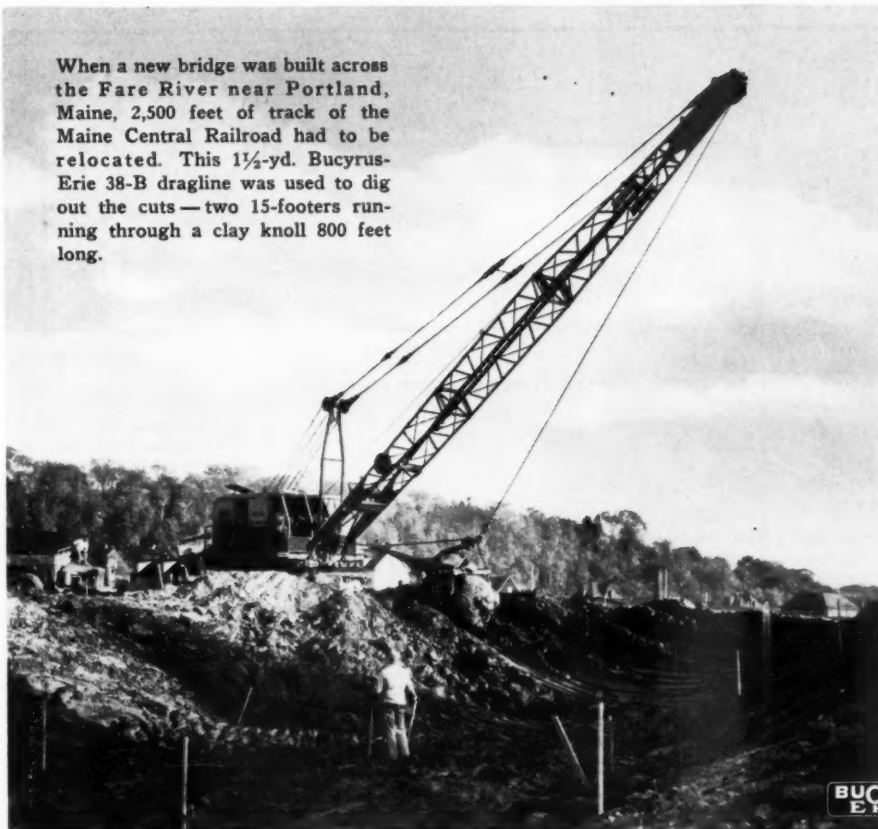
For steam generators the calcium and magnesium represented by the hardness of the water is potential scale which can either be removed prior to use of the water or neutralized by internal treatment methods. Formation of scale in the steam-generator coils results in increased fuel demand and eventual failure of the coils due to burning. Internal treatment of the water in steam generators results in formation of sludge instead of scale which is proportional in amount to the hardness of the water being used.

So-called "zero" water has reference to water of both zero hardness and zero total dissolved salts, similar to distilled water, which can be produced by ion exchange. It is often called demineralized water. Use of this process has the advantage that chlorides, which have an adverse effect on the efficiency of the non-chromate type corrosion inhibitors, can be removed.

In steam generator use, the resultant low concentration of salts in the water in the coils makes lower rate of blowdown and less frequent acid washing of the coils and draining of the tanks possible. The main disadvantage of this method of water treatment is its cost.

CHANGE FRONT ENDS FAST — WITHOUT CHANGING EFFICIENCY

When a new bridge was built across the Fare River near Portland, Maine, 2,500 feet of track of the Maine Central Railroad had to be relocated. This 1½-yd. Bucyrus-Erie 38-B dragline was used to dig out the cuts—two 15-footers running through a clay knoll 800 feet long.



A Bucyrus-Erie 38-B is more than just a shovel with some alternate front ends. It's a machine that's designed to deliver the same smooth control, the same big-output operation, and the same over-all efficient performance with any front end. Use it as a shovel, dragshovel, crane, clamshell or dragline, and you'll find that jobs get done fast, costs are kept low.

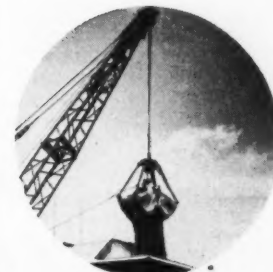
Still another advantage of the 38-B is its quick convertibility that saves time, lets you start working on the job quickly. No changes in major main machinery are necessary. Butt splices make it easy to add or interchange crane boom inserts, and jibs can be added without dismantling boom point machinery.

This kind of Individual Design — design that matches every machine component to the rated capacity of the 38-B — is an extra measure of value that will help your maintenance-of-way crews handle more jobs at low costs. See your Bucyrus-Erie distributor soon for the complete details on the 38-B and for other Bucyrus-Erie machines from ¾ to 4 cu. yd.

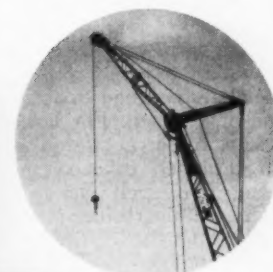
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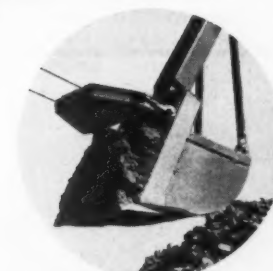
SHOVEL



CLAMSHELL



CRANE



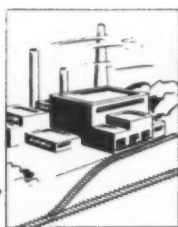
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DRAGLINE

BUCYRUS-ERIE COMPANY

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PRODUCTS OF MANUFACTURERS . . .

. . . new, improved equipment, materials, devices

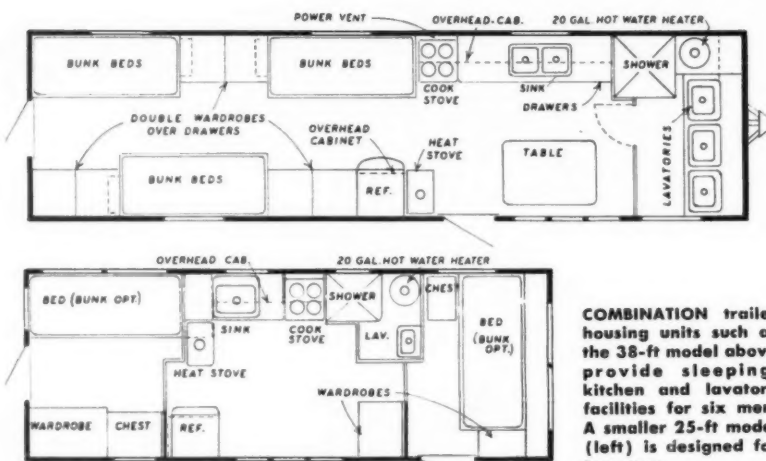
NEW LINE OF M/W TRAILERS

The Camef Equipment Corporation, Chicago, is offering a line of trailer-type camp equipment for housing maintenance-of-way personnel.

These trailers are designated by the name Krew Koach. Several sizes and arrangements are available in trailers containing both sleeping and kitchen facilities. Also available are trailers which provide only sleeping or kitchen-dining facilities. The combination units come in lengths varying from 21 ft to 38 ft.

The smaller units are designed for use by two men while the larger units are designed to accommodate five or six men. For larger gangs, a 42-ft trailer is offered as a bunk car designed to accommodate 12 men. For such gangs, a 42-ft kitchen-dining trailer is available.

Some of the equipment offered that is common to all of the trailers include Duo-Therm heating plants equipped with power blowers that force heated air into all parts of the



COMBINATION trailer housing units such as the 38-ft model above provide sleeping, kitchen and lavatory facilities for six men. A smaller 25-ft model (left) is designed for two men.

trailers, 20-gal gas hot-water heaters, built-in lavatories, mirrors, and partitions separating the bathroom from the other parts of the trailers.

Some of the features of construction are 6-in I-beam electric-welded frames and 2-in by 6-in floor joists, placed at 2-ft intervals to form a cell structure which is insulated by 2-in fiberglass with reflective alum-

inum paper. The floors are constructed of $\frac{3}{4}$ -in fir plywood covered with vinyl tile. In addition, one-half-inch fiberboard is used to cover the bottom of the floor joists. All floor and side-wall construction is glued for additional strength. The exteriors are covered with aluminum and the roof is covered with galvanized steel.



IMPROVED FAIRMONT WEED BURNER

Fairmont Railway Motors, Inc., Fairmont, Minn., has announced a new improved self-propelled weed burner known as Class W55 Series B.

The unit makes use of hydraulic

power to position the five burner heads horizontally, while cables and chains are used to govern the vertical movement. The outer shells of the five burner heads are made of welded steel and are nickel plated

which, according to the manufacturer, gives longer life.

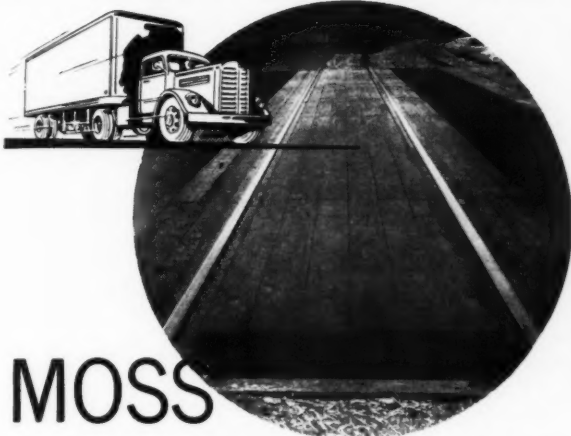
Each burner head has three atomizing nozzles to give a more consistent flame.

The propelling and blower engines of the unit are basically the same, each having six cylinders with overhead valves. The propelling engine has a generator, a 14-in single-plate clutch, and a three-speed transmission with remote controls. The blower engine has a clutch in the power takeoff. Instruments include tachometers for both engines and a vacuum gage and adjustable road speed governor for the propelling engine.

Available accessories for this burner are a torque converter drive, four-wheel drive, cab doors and safety glass windows, vacuum windshield wipers, hot water cab heater and engine-hour meters.

(Continued on page 56)

Something New Has Been Added...



MOSS

PRESSURE TREATED CROSSINGS

*4 Through Bolts Instead of 3
in the Assembled Slab Mean*

- GREATER STABILITY
- LONGER LIFE
- SMOOTHER RIDING

It's the latest development in Moss' continuing search for ways to provide stronger, smoother and more durable railroad grade crossings. And that's not all. Moss through bolts are now provided with lock nuts that can't shake loose, even under continuous heavy traffic.

More reasons why Moss Crossings are your best investment!

VERSATILE:

Pre-framed for single or multiple, tangent or curved track. Adapted to crossing through railroad turnouts. Suitable for crossings at any angle with track.

DURABLE:

Built of tough, pressure-creosoted black gum, highly resistant to shock and abrasion, with interlocking grain that gives extra resistance to wear. Many have given 15 and more years of smooth, trouble-free service.

EASY TO INSTALL:

Timbers are cut and fitted to your specifications. Can be installed by a small track gang with regular tools. Easy to move from one location to another.

**FOR CROSSINGS THAT LAST AND LAST—
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700 SECURITY BUILDING • ST. LOUIS 3, MISSOURI
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I Morrison-International CAMPCARS offer comforts never before possible for M/W Crews. They live better — and that means they work better.

Most important — it puts your crews on-the-job and keeps them there at minimum cost. So little — in fact — that CAMPCARS can house 8 men for less than the hotel allowance for one.

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Seven Standard Models available — all designed, engineered and built by a company that has been servicing and supplying railroads for more than 30 years.

*Learn all there is to know about this important new development in Off-Track Housing.
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Pioneer of
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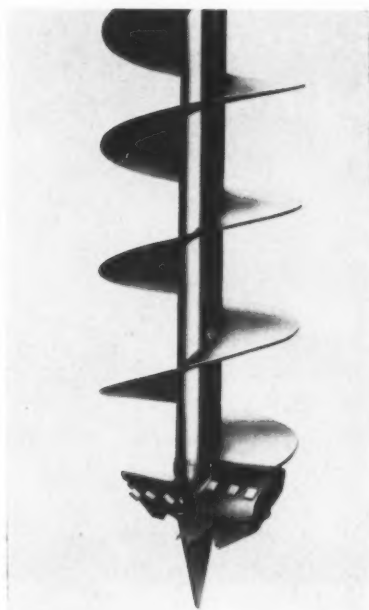
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BUFFALO 12, N. Y.

JANUARY, 1956

55

New Products (Cont'd)



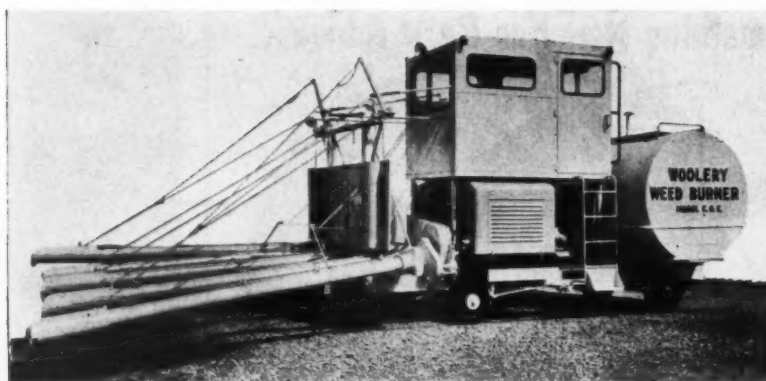
HOLAN auger equipped with Holan standard head.

EARTH AUGERS

THREE TYPES of earth augers—anchor, short flight and long flight—have been announced as a new line for diggers by J. H. Holan Corporation, Cleveland, Ohio. These augers are available in 8, 9, 10, 12, 14, 16 and 22-in diameters and are usable for drilling holes up to 8 ft in depth. Augers are furnished with either Holan standard head or Pengo head. Holan cutter heads and points are grooved so that they fit together for perfect alinement. Pengo cutter heads have a twin-helix pilot bit that are said to provide two equal cutting areas. Anchor augers are used for digging anchor holes at an angle. Short-flight augers are 6 ft long and have 3 ft of flighting while long-flight augers are 6 ft long with 5½ ft of flighting. The new line was developed for use with Holan 4401 mechanical and hydraulic portable earth borers.

ICE-MELTING CHEMICAL IS FAST

A new ice and snow-melting chemical has been announced by the Consolidated Paint & Varnish Corp., Cleveland. The new compound is in the form of small white



BURNER HAS TORQUE- CONVERTER DRIVE

The Woolery Machine Company, Minneapolis, Minn., has announced a new weed burner designated as the Model C.O.E. The burner has a frame constructed of 10-in steel channel sections and weighs 17,500 lbs.

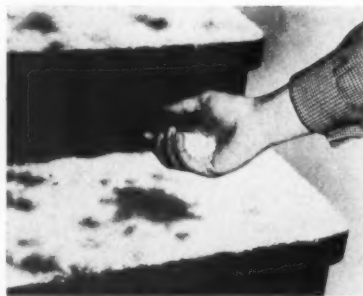
The machine is powered by two 6-cylinder Ford or Continental engines. The propelling engine has a torque-converter drive through the directional gear while a chain and sprocket assembly to all four wheels is used for the final drive. The final drive assembly is located outside the frame and wheels for accessibility, the drive speed of the machine can be varied to suit the conditions, by means of the torque converter. A steel, pressure-type blower is operated by means of a

multiple V-belt drive from the blower engine.

All five burners of the machine have an electric ignition system and the nozzle capacity of each burner is rated at 50 gph. Either diesel fuel oil or No. 2 fuel oil can be used. The fuel is stored in a tank mounted on the machine that has a capacity of 1500 gal.

The burner tubes are 10 ft in length and the two outside units are controlled from the fully enclosed cab. The width of strip covered by the burners in a single trip is 25 ft while the maximum width with the tubes extended is 35 ft.

The machine is equipped by vacuum brakes acting on all four wheels. A foot brake is available for parking or an emergency. Equipment available at extra cost includes a 90 gpm pump for filling the fuel-oil tank and a 2½-in 50-ft suction hose.



pellets and is known as Ice-Chaser. It is said that the pellets spread as they melt and efficiently remove ice and snow 30 times faster than salt. The compound is recommended for use on steps, sidewalks, driveways, streets, parking areas, loading platforms and ramps, railway switches, gutters, downspouts and drains. It is said that the compound leaves no residue, is safe for vegetation and is non-corrosive.



MACHINE FOR TROWELLING CONCRETE

A 3-BLADED lightweight machine for trowelling concrete has been announced. This machine, known as

(Continued on page 66)

1931 **25 CONSECUTIVE YEARS** 1956 MODERN BALLAST CONDITIONING



BEFORE "R. B. C. C." Service



AFTER "R. B. C. C." Service

"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 25 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.



RAND TOWER
MINNEAPOLIS, MINN.



METROPOLITAN BANK BLDG.
WASHINGTON, D. C.





THE MONTH'S NEWS...

... among railway men—the associations—the suppliers

Changes in Railway Personnel

General

H. A. Loutzenhiser, supervisor maintenance of way of the Lake Terminal at Lorain, Ohio, has been appointed assistant general superintendent with headquarters at the same point.

Robert D. Timpany, assistant superintendent on the Boston & Albany, at Albany, N. Y., an engineer through training and experience, has been promoted to superintendent of the St. Lawrence and Adirondack divisions at Watertown, N. Y.

Engineering

J. W. Davidson, designer in the engineering department on the Burlington at Chicago, has been promoted to assistant bridge engineer with the same headquarters. Mr. Davidson replaces **W. E. Spate**, who has resigned.

Edward A. Gill, division engineer on the Southern at Greenville, S. C., has been appointed engineer maintenance of way of the Carolina & Northwestern at Charlotte, N. C.

A. G. Smith has been appointed division engineer on the Soo Line, Winnipeg division, with headquarters at Thief River Falls, Minn. Mr. Smith succeeds **J. R. Hosefield**, who has resigned.

R. A. Sharood, chief engineer of the Quebec, North Shore & Labrador at Seven Islands, Que., has resigned to become associated with a consulting engineering firm.

B. E. Crumpler, assistant engineer on the Norfolk & Western at Bluefield, W. Va., has been promoted to the newly created position of assistant to chief engineer at Roanoke, Va. **L. A. Durham, Jr.**, assistant engineer at Norfolk, Va., has been transferred to Bluefield to replace Mr. Crumpler. **J. S. Felton, Jr.**, crossing engineer, has been promoted to assistant engineer at Norfolk to succeed Mr. Durham, and **P. P. Dunavant, Jr.**, assistant building engineer, replaces Mr. Felton. **A. W. Campbell**, draftsman, has been promoted to assistant engineer of building, replacing Mr. Dunavant.

A. L. Fisher, whose retirement as division engineer of the Western division of the Frisco at Enid, Okla., was announced recently (*RT&S*, Nov. p. 73), was born on September 23, 1885, at Elgin, Tex. He graduated from the University of Texas with a BS degree in civil engineer-

ing and entered railroad service with the Frisco on June 6, 1912. Earlier he had been employed by a private engineering firm engaged in railroad surveys in southwest Texas.

Kenneth L. Moriarty, chief engineer, system, of the New York Central, with headquarters at New York, has been promoted to vice-president in charge of operations at that point. Mr. Moriarty was born on November 18, 1896, at Joliet, Ill., and began his railroad career in 1918 in the engineering department of the Chicago Great Western. He entered service with the Denver & Rio Grande as division engineer at Gunnison, Colo., in July 1924. Later he served in that posi-



Kenneth L. Moriarty

tion and as roadmaster and trainmaster at various points on the road until 1939, when he was promoted to superintendent at Grand Junction, Colo. He was transferred to Salt Lake City, Utah, in 1943. Mr. Moriarty was appointed assistant chief engineer in February 1946, chief engineer in January 1948, and assistant general manager in 1951. He was promoted to general manager in 1952 and was elected vice-president, operations, in 1954. Later that same year he was appointed chief engineer, system, of the New York Central.

Charles E. McEntee, whose promotion to assistant engineer ties and treatment for the Illinois Central at Chicago, was announced recently (*RT&S*, Dec., p. 81), was born at McGehee, Ark., on June 25, 1926, and obtained a civil engineering degree from the International Correspondence Schools. He entered service with the Illinois Central on April 1, 1949, as an engineer apprentice at Chicago and

subsequently served as chainman and rodman at this point until 1952 when he was promoted to instrumentman at Waterloo, Iowa. He held that position until his promotion to assistant engineer ties and treatment.

John H. Spicer, whose promotion to district engineer on the Canadian National at Edmonton, Atla., was announced recently (*RT&S*, Dec., p. 76), was born August 12, 1924, at Moose Jaw, Sask. He graduated from the University of



John H. Spicer

Manitoba in 1948 with a BS degree in civil engineering, and entered railway service with the Canadian National in May of that year as an instrumentman at Vancouver, B. C. He was promoted to office engineer at that point in October 1949, and to assistant engineer at Winnipeg, Man., in 1950. Later he became assistant division engineer at Winnipeg and was advanced to acting division engineer at Port Arthur, Ont., in January 1951. He was transferred to Winnipeg in August 1951, and was promoted to division engineer at Prince Rupert, B. C., in January 1952. He subsequently served in this capacity at Kamloops, B. C. until June 1955, at which time he was promoted to assistant district engineer at Edmonton.

J. L. Fergus, whose appointment to acting chief engineer of the Nashville, Chattanooga & St. Louis at Nashville, Tenn., was announced recently (*RT&S*, Dec., p. 79), was born at Bellefontaine, Ohio, on June 20, 1890. He received his education at Ohio State University and entered railway service as a rodman in 1911 on the Louisville & Nashville. In June 1912 he was appointed assistant

resident engineer on reconstruction and double tracking at Athens, Ala. In 1915, Mr. Fergus was transferred to the valuation department and while thus engaged he received an appointment as assistant engineer on the Chattanooga division of the NC&StL with headquarters at Nashville. He subsequently served as super-



J. L. Fergus

visor of track, resident engineer, and assistant engineer in the real estate department. Mr. Fergus was appointed division engineer of the Chattanooga division in June 1925, and was promoted to assistant chief engineer in September 1949, with headquarters at Nashville, which position he held until his recent appointment.

Four engineering officers of the New York Central have retired, effective January 1. They are J. F. McCook, designing engineer, Lines West, with headquarters at Chicago; E. H. McGovern, engineer maintenance of way, with headquarters at Indianapolis, Ind.; W. H. Miesse, district engineer at Detroit; and G. T. Donahue, engineer maintenance of way, Lines West, with headquarters at Cleveland.

Mr. McCook, a native of Brooklyn, N. Y., attended Columbia University and joined the New York Central in 1924 as a junior engineer in New York. From 1925 to 1934, and again in 1937, he served as engineer on the West Side improvement project in New York. From 1934 to 1936 he was an engineer on a grade crossing elimination project at Syracuse, N. Y. He also worked on a grade crossing elimination project at Herkimer, N. Y., and in 1943 was transferred to Cleveland to supervise construction of a large project. Mr. McCook became assistant division engineer at Chicago in 1945 and was promoted in 1946 to division engineer at Detroit, returning to Chicago in that capacity in 1948. He was promoted to assistant to vice-president in 1952, with headquarters at Chicago, and became designing engineer, Lines West, in April 1953.

Mr. Donahue was born in Watertown, N. Y., on July 6, 1890, and graduated from Ohio State University with a BS degree in civil engineering. He entered service with the New York Central in 1919 as assistant supervisor of track at Rochester, N. Y. In 1926, he was promoted to assistant division engineer and also served in that capacity at Syracuse, N. Y. He was made supervisor of track

The THORO System of Masonry Protection

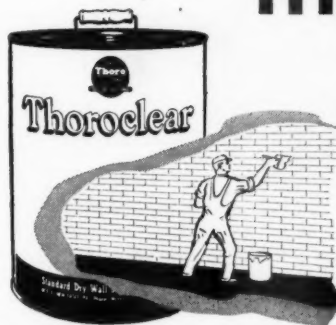
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Invisible Water Repellent

Ask your dealer about this powerful silicone water repellent developed by years of research by General Electric Company and now produced by us for your protection. Ask for Circulars No. 30 and 31.

No change in color or texture of brick, limestone, sandstone, tile or stucco surfaces. Applied by brush or spray.

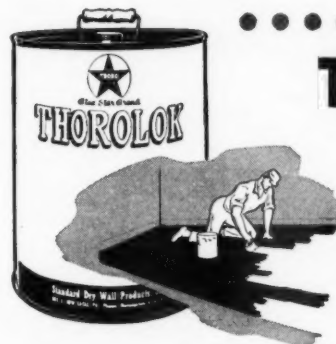
Keep water out of your masonry walls and protect interior plaster, paints and expensive furnishings.



THORITE

20 Minute Set Patching Compound

Repair those broken sills, steps, concrete floors, chimneys and other defective masonry! Ask for circular No. 20.



THOROLOK NO. 100

Use it for your basement or factory floors. New, with special alkali resistant pigments. Ask for Color Card 32-C.

Manufacturers of

WATERPLUG, THOROSEAL, QUICKSEAL

for all types of
masonry protection!

GET OUR PICTORIALY DESCRIBED
LITERATURE "HOW TO DO IT"

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNSYLVANIA





ORTON
Torque-Control

"The most important thing
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**THIS ONE DOESN'T
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CRANE & SHOVEL COMPANY
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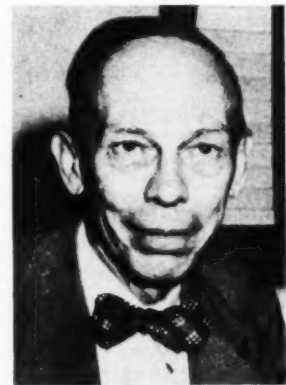
All ORTON cranes now
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- Aero (Rubber Tired)
Cranes — Catalog
No. 85
- Powermatic (Crawler)
Cranes — Catalog
No. 87

Railway Personnel (Cont'd)

in 1930 at Watertown, and also served in that capacity at New York on the West Side improvement project. In 1937, he was made special engineer at New York and was promoted in 1942 to division engineer at Chicago. He was promoted to assistant district engineer at Cleveland in 1943 and to district engineer at that point in 1944. In 1953, he was promoted to engineer maintenance of way, Lines West, with headquarters at Cleveland, which position he held until his recent retirement.

J. C. Aker, whose retirement as chief engineer of the Nashville, Chattanooga & St. Louis was announced recently (*RT&S*, Dec., p. 79) was born in Delaware City, Del., on March 9, 1889. He graduated in 1908 from the University of Delaware where he majored in civil engineering. He was employed part time during his college years by the Louisville & Nashville on construction and maintenance. After graduation in 1914, he was



J. C. Aker

employed with the engineering department of the NC&StL and was promoted in 1915 to resident engineer in charge of grade revision on both the Chattanooga and Nashville divisions. He was given a special assignment in 1919 with the engineering and real estate departments and was promoted to assistant engineer in 1923. He was advanced to assistant chief engineer in January 1939, and was promoted to chief engineer in September 1948.

George L. Roberts, whose promotion to terminal engineer of the Toronto Terminal, was announced recently (*RT&S*, Nov., p. 76), was born in England on February 4, 1923. He graduated from the British Institute of Technology and entered service with the Canadian Pacific on May 1, 1948, as a transitman. In March 1950 he joined the Toronto Terminal as assistant engineer which position he held until his recent promotion.

T. F. Burris, chief engineer of the Chesapeake & Ohio, Northern Region, with headquarters at Detroit, has been temporarily assigned to special duty in the office of the chief engineer, Southern Region, at Richmond, Va. **E. T. Rucker**,

assistant to vice president, construction and maintenance, at Huntington, W. Va., has been appointed acting chief engineer, Northern Region, at Detroit, replacing Mr. Burris. **R. L. Milner**, staff engineer at Huntington, has been appointed staff assistant to vice-president, construction and maintenance, replacing Mr. Rucker. **W. J. Dixon, Jr.**, assistant cost engineer at Richmond, Va., has been appointed resident engineer with headquarters at the same point. **W. M. S. Dunn**, general roadmaster of the Nickel Plate, with headquarters at Bellevue, Ohio, has resigned to become staff engineer to the vice-president, construction and maintenance, of the C&O, with headquarters at Huntington.

Robert K. McKinnon, whose promotion to engineer of bridges for the Central of Georgia at Savannah, Ga., was announced recently (*RT&S*, Dec., p. 79), was born April 12, 1926, at Columbia, S. C. He graduated in 1947 from Clemson College with a BS degree in civil engineering and entered service with the Central of Georgia on March 1, 1948, as assistant engineer in the bridge and building department. He subsequently held this position with the track department and again with the bridge and building department until May 1955. He was then promoted to assistant engineer of bridges which position he held until his recent promotion. All of Mr. McKinnon's service has been in the office of chief engineer at Savannah.

Reginald Hugo, assistant bridge engineer on the Canadian National at Winnipeg, Man., has been promoted to bridge engineer, Western Region, with the same headquarters. **Alexander M. Pepper**, structural designer, succeeds Mr. Hugo as assistant bridge engineer.

Track

Walter D. Geldhart, whose promotion to roadmaster on the Canadian National at Chipman, N. B., was announced recently (*RT&S*, Nov., p. 74), was born April 5, 1900, at Nixon, N. B. He entered service with the Canadian National on May 5, 1920, as a section laborer. While employed in this capacity, he obtained additional education through courses offered by the International Correspondence Schools and in October 1932 was promoted to relief section foreman. He was promoted to regular section foreman at Thomson, N. S., in March 1955. He subsequently held the positions of section foreman and extra gang foreman at various points on the road until his promotion to assistant roadmaster on the Springhill subdivision in 1951.

J. R. Trower, roadmaster of the Frisco's 13th track division at Yale, Tenn., has been appointed roadmaster at the road's new hump-retarder yard near Memphis, Tenn. Construction of the yard, which will be known as the Tennessee yard, was started recently. **J. H. Krewson** succeeds Mr. Trower as roadmaster at Yale. **D. C. Gement** has been appointed assistant roadmaster at the Tennessee yard. **O. W. Hawkins** has been appointed assistant roadmaster on the 70th track

division with headquarters at Chaffee, Mo., replacing **B. J. Bishop** whose promotion to roadmaster at Hugo, Okla., was announced recently (*RT&S*, Nov., p. 81).

Mr. Bishop was born April 25, 1926, at Caldwell, Mo. He graduated in 1951 from the Missouri School of Mines and Metallurgy at Rolla, Mo., with a BS degree in civil engineering. He entered service with the Frisco on June 1, 1951, as a student apprentice at Fort Smith, Ark., and subsequently held the same position at Amory, Miss. On June 1, 1953, he was appointed student supervisor at Amory and was promoted to assistant roadmaster on the River division in 1954, with headquarters at Chaffee.

Frank B. Stafford has been appointed assistant supervisor of track on the Chesapeake & Ohio with headquarters at Holly, Mich.

Bridge and Building

F. L. Richardson has been appointed to the newly created position of assistant general foreman, B&B and WS, on the Frisco's Western division, with headquarters at Enid, Okla.

J. S. Ellis, assistant cost engineer on the Chesapeake and Ohio, at Richmond, Va., has been appointed assistant supervisor bridges and buildings at Hinton, W. Va.

C. F. Cantrell, Jr., whose promotion to general foreman bridges and buildings on the Vicksburg division of the Illinois Central, was announced recently (*RT&S*, Dec., p. 80), was born on August 1, 1928, at Sibley, La. He entered service with the Illinois Central on June 6, 1944, as a carpenter helper and was made carpenter the following year. In 1948, he was promoted to pile-driver engineer and was appointed assistant foreman bridges and buildings in 1953, which position he held until his recent promotion. All of Mr. Cantrell's service has been on the Vicksburg division.

Association News

Track Supply Association; B. & B. Supply Association

Early in January application forms will be sent out for making space reservations for the joint exhibition of these two associations, to be held September 17-20, 1956, at the Coliseum at Chicago. The exhibition will be held concurrently with the annual conventions of the Roadmasters and Maintenance of Way Association and the American Railway Bridge & Building Association. Officers of the

two supply associations state that plans are being made to assure that this will be one of the finest exhibitions they have held. Interested manufacturers should address inquiries to Lewis Thomas, director of exhibits, Room 705, 59 E. Van Buren Street, Chicago 5.

Northwest Maintenance of Way Club

The next meeting of the club will be held on January 26 at the Midway Civic Club, 1931 University Avenue, St. Paul, Minn. The principal speaker will be Peter T. McKinney, manager of public relations, Union Carbide & Carbon Corporation, who will discuss and show about 60 slides on the history of rail, going back about 300 years, or to the first use of rail in coal mines in England.

American Railway Engineering Association

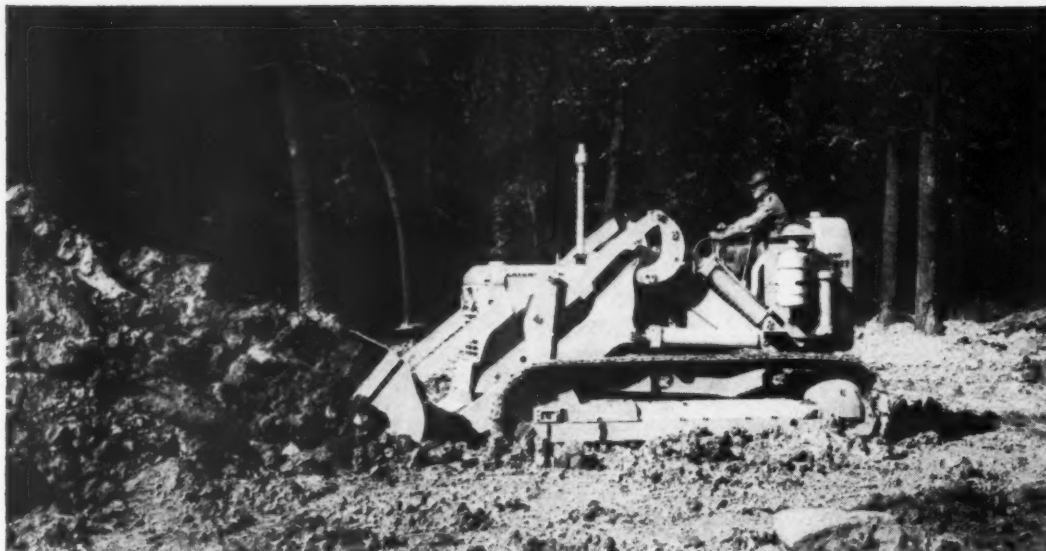
Five committees have scheduled meetings to be held during January, one of them tentative. These meetings are definite: Buildings—Tutweiler hotel, Birmingham, Ala., January 19-20; Yards & Terminals—Jefferson hotel, St. Louis, January 20-21; Economics of Railway Labor—Lennox hotel, St. Louis, January 9;— and Maintenance of Way Work Equipment—Fort Shelby hotel, Detroit, Mich., January 23-24. The committee on Wood Bridges & Trestles has tentative plans for a meeting but the details have not been announced.

Preliminary plans are being made for the annual convention which will be held at the Palmer House, Chicago, March 13-15. In the absence of a manufacturers' exhibit this year, a new feature is being introduced—a pre-convention motion picture theater all day Monday, March 12. Present plans are that the theater will be located in the exhibit hall of the hotel, just off the convention floor. It is contemplated that a total of six hours of railroad films (three in the morning and three in the afternoon) will be shown. It is expected that a dozen or more selected films, related to the work of the members, will be shown.

As an auxiliary to the theater throughout the day, there will be a reception area and "coffee bar," co-sponsored by *Railway Track & Structures* and the National Railway Appliances Association. This feature will continue daily during the convention as a "breakfast bar."

Maintenance of Way Club of Chicago

The January meeting of the club will be held on the 23rd at the usual place of meeting—the Hamilton Hotel, Chicago. The speaker of the evening will be John W. Barriger, vice-president, Chicago, Rock Island & Pacific, whose subject will be "Better Railroads for a Greater America." Mr. Barriger's address (*Continued on page 64*)



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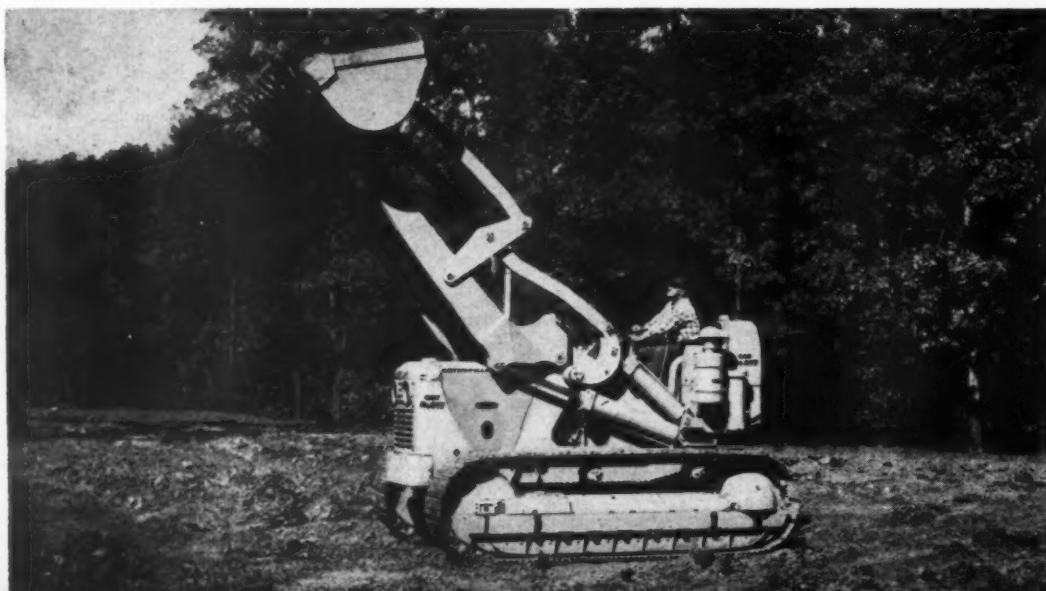
Ample power
and traction to
"bury" the bucket.

CATERPILLAR ANNOUNCES THE NEW NO. 977

Here's the new boss of the excavator-loaders...the new Caterpillar No. 977 Traxcavator. The No. 977 has important new features which greatly increase productivity and earning power.

FEATURES OF THE NO. 977 TRAXCAVATOR

- 96-in., 2¼-cu.-yd. bucket.
- 100 HP CAT* Engine, with ample power to "bury" the bucket and lift big loads.
- Newly-designed bucket tips back 40° at ground level to retain heaping loads.
- More than 11½ ft. of dumping height make it easy to load any truck or railroad car.
- Steel bumpers on lift arms allow rapid jarring of bucket, and 50° discharge angle helps to empty sticky materials fast.
- Automatic kick-outs put bucket in "hold" position at maximum height and position bucket for digging on next pass. Easier operation and faster cycle times.
- Advanced hydraulic system, with pump protected by full flow filter.
- Hardened, spool-type operating valves located in large tank, protected from dirt or damage.
- Long-lived, trouble-free oil clutch.
- Fast, one-hand bucket operation. High seat for comfort and visibility.
- Five forward speeds to 7.4 MPH; four reverse speeds to 7 MPH.
- Each track controlled by heavy-duty dry multiple disc steering clutch and contracting band brake.
- Tools for any job: 3-yd. bucket for light material; 9-tooth quarry bucket; heavy-duty bucket; skeleton rock bucket; log and lumber fork.



3

High lift,
with over 11½ ft.
of dumping height.

2

40° tip back
at ground level
to hold load.



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MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

Please send full information about the new No. 977 Traxcavator.

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Now three sizes of Traxcavators are available for all your excavating and material-handling needs. They're *unit-built* machines, so efficient that you'll find they match or excel competitive equipment with nominally greater bucket sizes. You can choose the right Traxcavator for your job from the No. 933 (1 cu. yd.)—the No. 955 (1½ cu. yd.)—or the No. 977 (2¼ cu. yd.).

Let your Caterpillar Dealer show you how these new machines can make money and *save* money for you. Get complete information from him. Or mail the coupon.

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**LEADERSHIP
IN ACTION**

4

Fast, sure
dumping of sticky
materials.



Association News (Cont'd)

(Continued from page 61)

will consist of an analysis of the basic railroad problems and what should be done about them from the standpoint of regulation, taxation and plant and equipment improvements.

The last meeting was held on December 19. V. C. Hanna, chief engineer, Terminal Railroad Association of St. Louis, spoke on "Maintenance of Railroad Crossings."

Bridge & Building Association

The Executive committee of the association held its regular year-end meeting at Ashland, Ky., on December 5 and 6. In addition to much routine business, the committee selected the chairmen, vice-chairmen and personnel of all the subjects committees that are to prepare reports for presentation at the annual convention in September.

Roadmasters' Association

On November 28 the Executive Committee of the Association held a meeting at the Engineers' Club, Chicago. The

principal item of business was the organization of the subjects committees that are to present reports at the annual convention in September. The chairmen, vice-chairmen and personnel of all the committees were selected.

Supply Trade News

General

Armco Drainage & Metal Products, Inc., has started construction at Middletown, Ohio, of a new \$1½-million plant to manufacture a new line of prefabricated, truss-type, steel buildings. The new plant will be a prototype building, using the same design features as the prefabricated buildings that will be manufactured there. The structures manufactured at the new plant will be available in clear-span widths up to 100 ft. and in unlimited lengths. Armco's present prefabricated Steelox buildings have a maximum clear span width of 40 ft.

Personal

Roger B. Coleman, salesman in the Railroad Division of **Chipman Chemical Company, Inc.**, has been promoted to assistant Railroad Division sales manager with headquarters at Bound Brook, N. J.

N. V. Chehak has been appointed assistant sales manager of the **Link Belt Speeder Corporation**, with headquarters at Cedar Rapids, Iowa.

STAN H. HAIGH, St. Paul, Minn., who heads his own company there, has been appointed sales representative for Nordberg railway equipment and Power Chief



Stan H. Haigh

engines in the Minneapolis, St. Paul, and Duluth, Minn., areas. The Stan H. Haigh Company was recently formed to specialize in the distribution of railway maintenance supplies and equipment.

The Lincoln Electric Company has announced the opening of a new branch office and warehouse at Denver, Colo. **Merrill F. Yale**, sales engineer in Lincoln's San Francisco office, has been promoted to district manager for the Denver area.

The Pacific Coast Borax Company has announced the following personnel changes in its Agricultural Sales division: **F. T. Winters, Jr.**, has been appointed special advisor on herbicide sales to the parent company, **Borax Consolidated, Ltd.**, London, Eng. **Dale Rake** has been appointed director of agricultural research and development at Los Angeles, Calif. Mr. Rake succeeds **L. M. Stahler**, who has been appointed manager of the Agricultural Sales division with headquarters also at Los Angeles.

V. J. NIEDERRITER has been appointed manager of the railroad products department, Railroad Division, Fairbanks, Morse & Co., with headquarters at Chi-



V. J. Niederriter

cago. He succeeds **William G. Hergig** who has resigned to accept a special assignment with the Chicago branch of the corporation.

Edward R. Couch has been appointed manager of stationary compressor sales for the **Le Roi Division of the Westinghouse Air Brake Company** at Milwaukee, Wis.

Robert B. Hornberger has been appointed Pacific Coast sales agent of the **P. & M. Company**, with headquarters at San Francisco, Calif. He succeeds **Royal D. Hawley** who has retired, but whose services will be retained as consultant. Mr. Hornberger has also been appointed Pacific Coast sales agent for the **Maintenance Equipment Company**, also succeeding Mr. Hawley whose services will likewise be retained by that company as consultant.

P. D. Shollar and **J. F. Haley** have been promoted to departmental vice presidents, **Koppers Company, Inc.**, Pittsburgh, Pa. Mr. Shollar has been manager of the Procurement department since 1953 and Mr. Haley, manager of the Traffic and Transportation department for four years.

Organizations

American Railway Bridge and Building Association—**Elise LaChance**, Secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—**Neal D. Howard**, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—**W. A. Penrose**, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Association—**L. R. Gurley**, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—**S. Kosco**, Secretary-Treasurer, 135 East Eleventh place, Chicago 5.

Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

Mississippi Valley Maintenance of Way Club—**P. E. Odom**, Secretary-Treasurer, Room 1008, Frisco Building, 906 Olive street, St. Louis 1, Mo.

National Railway Appliances Association—**Kenneth Cavins**, Secretary, 310 S. Michigan avenue, Chicago 4; **Lewis Thomas**, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Northwest Maintenance of Way Club—**L. C. Blanchard**, secretary-treasurer, Room 27, Milwaukee Depot, Minneapolis 1, Minn.

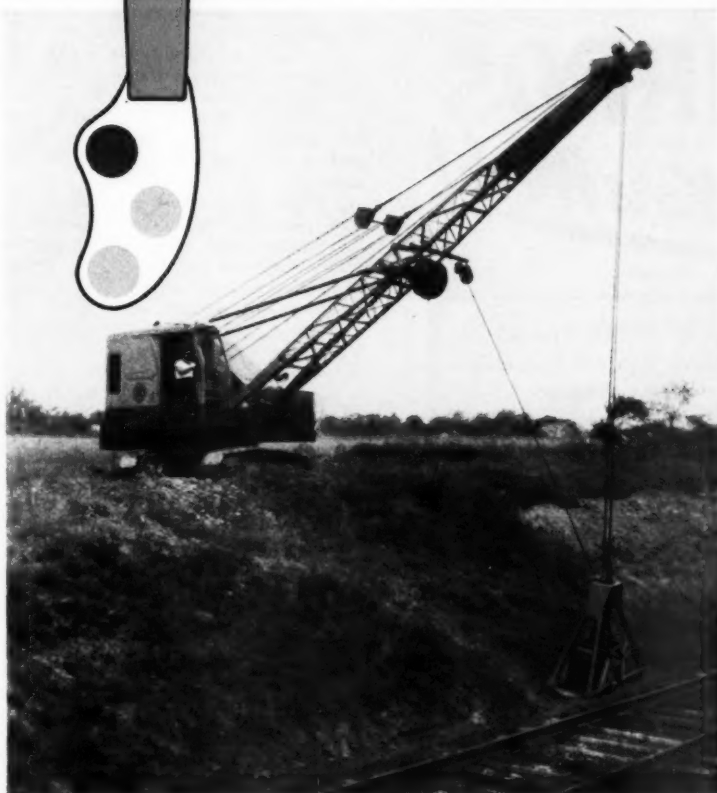
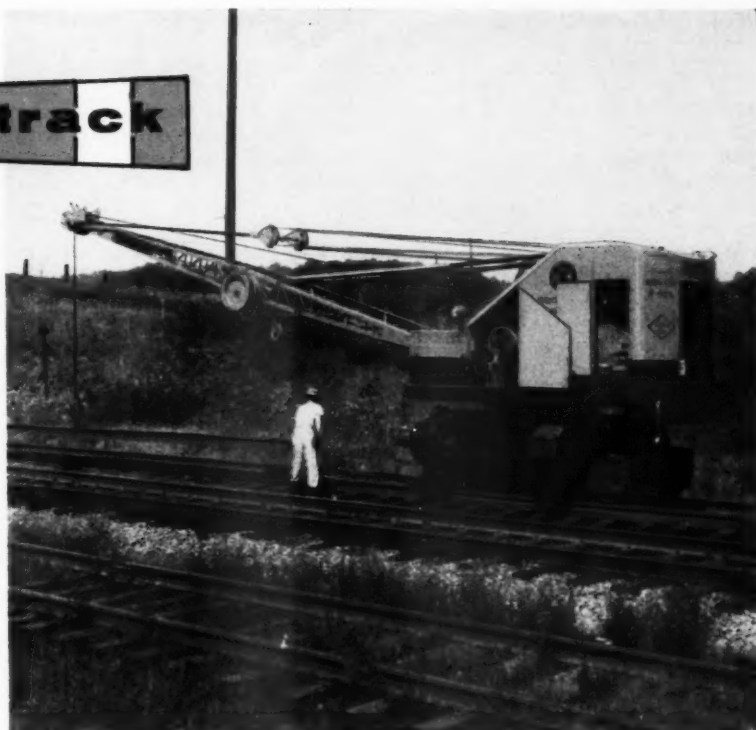
Railway Tie Association—**Roy M. Edmonds**, Secretary-Treasurer, 1221 Locust street, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—**Elise LaChance**, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—**Lewis Thomas**, Secretary, 59 E. Van Buren street, Chicago 5.



Koehring 205 RailAid powers its own rail car. It travels on-track from one work section to the next at speeds up to 20 m.p.h. — works on or off-car with all standard excavator or crane attachments. You can send it anywhere along the line or in yards at a moment's notice to do any digging, lifting or material-handling. Does 2 to 3 times the work of ordinary excavators or cranes that have to crawl or be hauled from job to job. Propulsion car has 2-axle drive, with airbrakes on all 4 standard-flange wheels. Torque converter gives smooth control of travel speeds. Car-well accommodates 16, 20 or 24-inch crawlers on the heavy-duty excavator or crane.



In less than 10 minutes, Koehring 205 loads or unloads itself on the ramp equipped propulsion car. Crane or excavator sets the car on or off-track, clears the right-of-way for normal traffic. Work of the 205 and road crew is uninterrupted during the entire shift. This on and off-track flexibility is combined with big work capacity. As a crane, the heavy-duty 205 safely lifts 6.9 tons from the car — 8.9 tons on the ground. It readily converts to clamshell, dragline, pile-driver, ½-yard shovel or hoe. This versatile 205 RailAid is widely used by many of the country's leading railroads (names available on request). Better get all the facts on what it can do for you.

SAVES TIME ON ALL THESE JOBS:

Ditching	Repairing trestles
Rail laying	Erecting bridges
Stockpiling	Setting steel
Piledriving	Loading cars
Wrecking	Storing parts
Salvage	Handling:
Grading	timbers, ties,
Clearing slides	ballast, ash,
Widening banks	coal, scrap

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K657

KOEHRING RailAid®



KOEHRING COMPANY, Milwaukee 14, Wis.
Subsidiaries: PARSONS — EWING-REX — JOHNSON

New Products (Cont'd)

(Continued from page 56)

Model G24 Roto-Trowel, is a product of Stow Manufacturing Company, Binghamton, N. Y. It weighs 69 lb and is said to be easily transportable, by one man, from point to point around the job. It is also reported that, because of its light weight, the machine can be put on the job soon after the laying of con-

crete. The pitch of the three rotating trowel blades is adjustable by means of a knob mounted on the handle, so that the trowel can be used for either floating or finishing. The machine is equipped with a stationary guard ring as a safety feature which is said to permit the operator to work up to walls and other obstructions.

The machine is also equipped with a "dead-man" control which is said to stop rotation of the blades

instantly, without stopping the engine, whenever the operator lets go of the handle. This is accomplished by means of a spring-loaded clutch actuated by a leaf spring controlled by a lever in the handle of the machine. The machine is driven by a 2.2-hp Briggs & Stratton engine. The belt drive is guarded for safety. The blades are manufactured of a special high-quality wear-resistant steel which is reported to provide extra long life.



*On Track...
Or On a Car-*

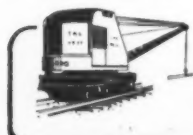
BURROS
Do More Work!

Burro Cranes are the busiest units on the road because they can work anywhere . . . do virtually anything . . . and do it faster at lower cost. Burro's low overall height and short tail swing permit efficient operation on a flatcar . . . fast travel speeds and powerful draw bar pull give it a wider operating range on the track.

Write for Bulletins on Burro Cranes

Only BURRO Cranes Give You All These Advantages

- Fast travel speeds . . . up to 22 MPH
- Draw bar pull of 7500 lbs. (often eliminates need for work train or locomotive)
- Elevated Boom Heels for working over high sided gondolas
- Short tail swing — will not foul adjoining track
- Low overall height — Burro can be loaded and worked on a standard flatcar.



CULLEN-FRIESTEDT CO.

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LETTERS FROM OUR READERS

Station Design as The Agent Sees It

Hickman, Nebr.

TO THE EDITOR:

Might I make a few suggestions from an agent-operator's point of view concerning the article in your November issue entitled Precast Concrete Stations. The design so well covered in this article was most likely designed without consulting the party most concerned—the agent-operator.

The light and visibility are wrong. The operator can only see trains approaching from one direction and sits with his back to the service window. He faces directly into the light with the additional light coming over his right instead of left shoulder.

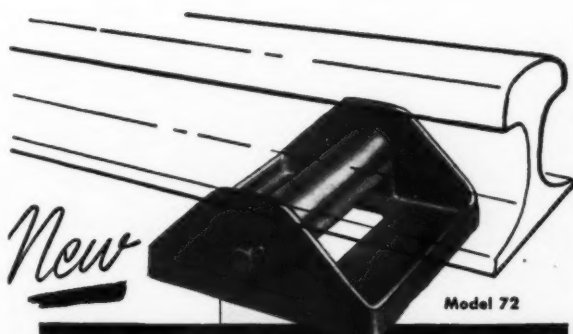
A bay window affords visibility in both directions and if the desk is placed out in the room instead of against an outside wall it improves the visibility as well as prevents eye strain, especially if the station faces east, south or west.

However, the design as illustrated would be much more satisfactory from the operator's standpoint if the door between the office and freight room had a large glass, and if a window had been placed opposite it in the freight room so that approaching trains could be visible from the operator's desk. This would also make for a lighter freighthouse, especially in cold weather when the freighthouse door should be kept closed.

Many of the old stations in use today have such round-about ways for the operator to get out to hand up orders to fast-approaching trains that it is apparent that "functional" designing has long been overlooked, as well as the telegraph desk facing an outside wall, where you must face the light and freeze your feet in the winter and melt in the summer.

Surely the designs could be improved with these common errors in mind, probably with very little increase in initial cost.

C. D. BUTCHER



SIMPLEX RAIL DOLLY

Makes Rail Bumping Faster, Easier, Safer

A REAL

WORK-SAVER

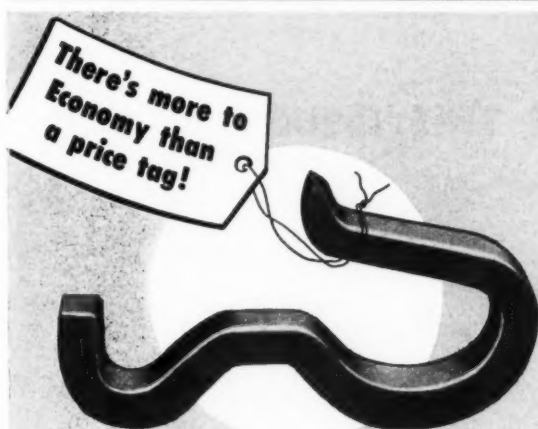
WHEN:

- Removing Rail
- Installing New Rail
- Lining Up Bolt Holes
- Driving Up Expansion
- Adjusting Switch Points
- Installing Welded Rail

• The Rail Dolly is a heavy-duty roller mounted on a low metal stand. Used in pairs, Rail Dollies handle the heaviest of bumping rails—make accurate bumping possible with less men. Cut damage to rail ends. Far safer than swinging rails with tongs or sliding on greased plates. Guides on each side of Dolly stand prevent rail from slipping off; cleats in base anchor Dolly firmly on top of ties or ballast. Another aid in driving rail, the Simplex Rail Puller and Expander, prevents rail from returning to its original position after bumping. Both devices described in Bulletin RR 72. WRITE:

TEMPLETON-KENLY & CO.

2543 Gardner Road, Broadview, Ill.



There's more to
Economy than
a price tag!

...look for Quality Durability Efficiency

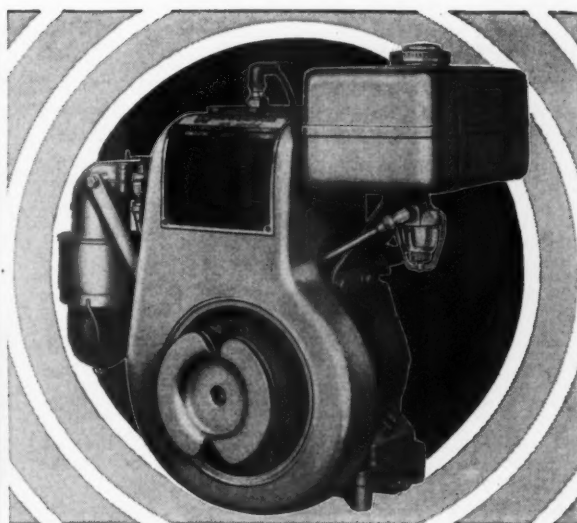
The **IMPROVED GAUTIER Rail Anchor** is made of tough, durable Alloy Spring Steel. The improved GAUTIER can be used again and again on new or old rail. The improved GAUTIER is engineered so that it can't be overdriven.

When you are in the market for rail anchors, may we suggest you look further than the price tag—look to GAUTIER—for real economy.

Manufactured and sold exclusively by

MID-WEST FORGING & MANUFACTURING CO.

General Offices: 38 South Dearborn Street, Chicago 3, Illinois • Mfg. Plant, Chicago Heights, Illinois



Another NEW WISCONSIN Heavy-Duty Air-Cooled ENGINE The Model BKN Single Cylinder 3.2 to 6.8 hp.

Brand new in design, this engine meets the increasing demand among original equipment manufacturers and engine power users for a compact, light weight, **HEAVY-DUTY Air-Cooled Engine** that offers a broad, flexible power range.

With a 17.8 cu. in. displacement, the new Model BKN delivers 6.8 hp. at its top speed of 3600 rpm., and 3.2 hp. at a minimum speed of 1600 rpm. Incorporated in this engine are all of the traditional Wisconsin Heavy-Duty features, including tapered roller bearings at *both* ends of the crankshaft; high tension rotary type *outside* magneto with Impulse Coupling; pump-circulated, constant-level splash lubrication system and efficient **AIR-COOLING** at all temperatures from sub-zero to 140° F.

The Wisconsin line of Heavy-Duty Air-Cooled Engines comprises a total of 12 different models, in 4-cycle single cylinder, 2- and 4-cylinder sizes, encompassing a power range of 2.3 to 36 hp. Here is power selectivity to fit your equipment requirements with maximum power advantage and economy — *Power to Fit the Machine and the Job.*

Our Engineering Department will be glad to co-operate with you in adapting Wisconsin power components to your equipment. For detailed data on the new Model BKN, write for Bulletin S-183.

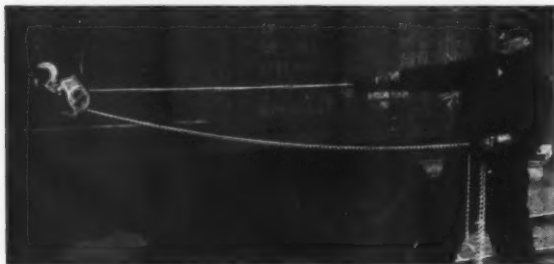


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World's Largest Builders of Heavy-Duty Air-Cooled Engines

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NOLAN ONE-MAN CAR DOOR OPENER



**Opens Any Box Car
Door in 20 Seconds
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Class 1
Railroads**

SPECIFY SEALED-TITE ZINC COATING.
Sealtite products sealed in zinc give twice the wear and greater economy by cutting expensive replacements. For Double-Life and freedom from corrosion, specify Hot-Dip Galvanized ... Sealed in Zinc!

See your Lewis representative, or contact factory for samples, prices and full details.



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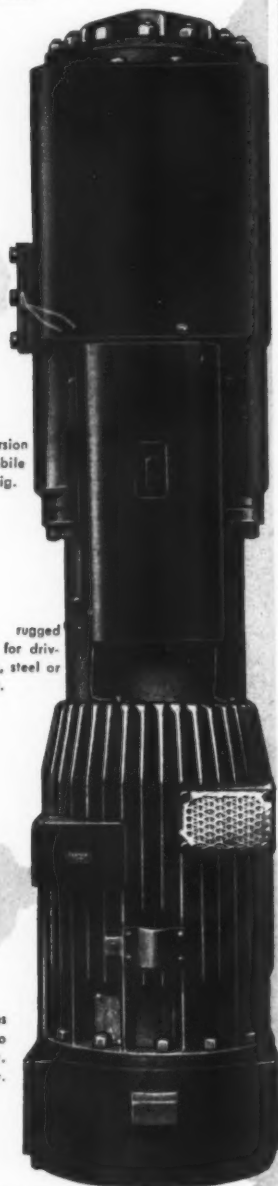
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Manufacturers' Literature

Following is a compilation of free literature, pamphlets and data sheets offered by manufacturers to the railroad industry. Circle the number(s) on the coupon below to receive the desired information. Requested items will be sent direct by manufacturers.

1. **CRAWLER TRACTOR.** *Allis-Chalmers.* Two brochures describe and illustrate engineering, design and performance features of Diesel-powered crawler tractors. 16-page catalog (MS-457) on the new HD-21 with hydraulic torque converter drive; and 8-page folder (MS-461) on the 45 drawbar hp. 12,400 pounds HD-6. Specifications, matched equipment and accessories included in both.

2. **SELF-PROPELLED ROLLER.** *Wm. Bros Boiler & Mfg. Co.* 4-page 3-hole punched brochure (RE-300) "First All Rear Wheel Drive Roller With Every Pair of Wheels Oscillating" describes, illustrates, gives specifications on Bros SP-54 Self-Propelled Pneumatic Tired Roller.

3. **SCRAPERS.** *Caterpillar Tractor.* Two pamphlets in conjunction with the new low bowl design Caterpillar scrapers illustrate and discuss three of the models. (A) "New Cat Wheel Tractors, Lowbowl Scrapers" on #456 and #470 scrapers; (B) "A New Caterpillar Scraper" on #463. (Write-in A or B on coupon to receive desired folder.)

4. **PAVING VIBRATORS.** *Maginniss Power Tool Co.* 4-page folder (LL-1892) describes and illustrates Maginniss Hi-lectric concrete paving vibrator attachments and multi-purpose generators; in-action photos show units in use.

5. **AUTOMATIC BOILERS.** *Boiler Engineering & Supply Co.* 4-page folder (BE 4A) "The Continental Spinning Gas Technique" illustrates and discusses Continental automatic boilers, points out "method of obtaining maximum heat transfer with simplified design."

6. **FIRE EXTINGUISHERS.** *Walter Kidde.* 12-page folder (P8R8) "Kidde Fire Protection" describes and illustrates Kidde line of fire extinguishers, complete fire detection and protection systems.

7. **CONTROLS AND PUMPS.** *New York Air Brake.* 16-page illustrated brochure (1102) describes products from line of vacuum and liquid pumps, air brake equipment, hydraulic motors, controls and pumps; on-the-spot photos show industrial uses.

8. **ADHESIVES, COATINGS.** *Minnesota Mining & Mfg. Co.* 8-page catalog "3M Brand Adhesives, Coatings, Sealers Serving The Railroad Industry" gives 23

typical uses of 11 different types of 3M adhesives, coatings and sealers used on a typical piece of rolling stock.

9. **POWER UNIT.** *Allis-Chalmers.* 8-page catalog (MS-455) gives design, engineering and performance story of four-cylinder 60-hp Allis-Chalmers W-226 power unit; includes specifications and cut-away views.

10. **TRACKWORK.** *U. S. Steel.* 128-page "USS Trackwork" contains data, photographs and diagrams on USS Trackwork products; in five sections, includes: introduction, crossings, frogs, switches and listing of parts nomenclature.

11. **NICKEL.** *International Nickel.* 52-page illustrated booklet "This Is Inco's Huntington Works" is the standard book explaining processes and operations at this West Virginia location; includes historical data, diagram of nickel from raw material to finished stock, picture story of extrusion, quality control and research.

12. **FLEXIBLE HOSE LINES.** *Aeroquip.* 4-page announcement folder "Aeroquip Announces the Big News in Teflon Hose," shows new Teflon hose line with detachable, reusable fitting. And, Bulletin AEB-9 gives technical and test data on 666 Hose and Super Gem fittings.

13. **STEEL BUILDINGS.** *Butler Mfg. Co.* 8-page booklet "Butler Steel Buildings for Railroads" describes and illustrates uses of Butler all-steel rigid-frame or Panl-Frame buildings.

14. **CATHODIC PROTECTION.** *Harco Corp.* 12-page technical brochure "Cathodic Protection Systems For Corrosion Control" describes corrosive effect caused by galvanic action of metals in contact with earth or water; discusses resultant savings made possible by cathodically protecting underground pipe lines.

15. **ROLLING DOORS.** *Kinnear Mfg. Co.* 1956 Kinnear catalog describes and illustrates the Kinnear line of steel rolling doors.

16. **BALANCED DOORS.** *Ellison Bronze Co.* 12-page catalog (Edition 42) "Ellison, The Balanced Door, The Door That Lets Traffic Through Quickly" describes, illustrates and gives specifications on the Ellison balanced door line; includes names and addresses of representatives.

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January, 1956

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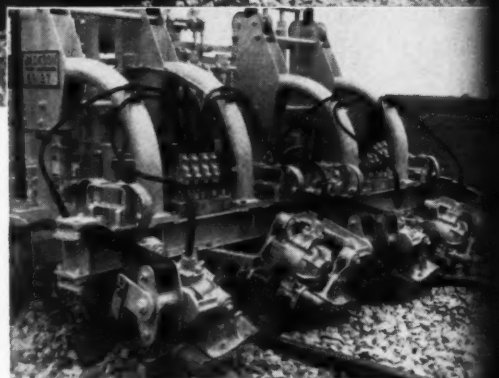
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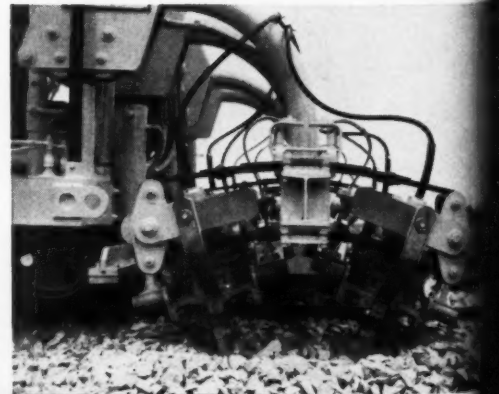
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